

MEDIANS, PARKS & TRAILS

This chapter provides guidance for design and approval of landscaped areas within streetscape corridors, developing park master plans and individual park designs, and creating non-paved, non-motorized, and shared-use trails throughout the city.

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480-312- 7250

One Stop Shop

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Plan Review

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www.ScottsdaleAZ.gov/Design/DSPM



medians,
parks & trails

LANDSCAPED MEDIANS

8-1

This section is intended to aid designers in developing hardscape, landscape, irrigation, and general aesthetic improvements for areas within the city's streetscape corridors. It recommends plants for specific character areas, provides landscape, irrigation, design, and sight distance guidelines, and requirements for inspections and as-built submittals.

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GENERAL INFORMATION

8-1.000

A. Median & Streetscape Character Areas

There are different median design standards for each character area within the city; contact the city of Scottsdale's Plan Review Services office to determine which character area designation to use for each specific project. Streetscape information is available at www.scottsdaleaz.gov/design/CorridorPlans/.

Medians within Commercial Cores as identified in the General Plan will be allowed a higher percentage of plant coverage with the plant materials for the character area in which they are located.

B. Downtown and Urban Character

The Downtown and Urban Character classification is given to the areas of the city in which pedestrian comfort is a primary consideration. When designing these areas concentrate on elements such as arcaded walkways, shade, decorative paving, and landscaping so that a comfortable setting can be created for this use-intensive area.

1. Balance the use of plant material with decorative paving (stamped concrete, exposed aggregate, pavers, etc.), to minimize the exposure of decomposed granite.
2. Median landscaping in the Downtown couplet system must conform to specifications in the Downtown Urban Design and Architectural Guidelines, Appendix A.
3. Plant palette and quantities must also conform to the Downtown Urban Design and Architectural Guidelines, Appendix A.

Downtown guidelines can be found on-line at www.scottsdaleaz.gov/projects/downtown/.

C. Suburban Character

The suburban character applies to areas of the city where compatibility should be achieved between pedestrians and transportation routes within a medium density development pattern. Using trees that are native and/or desert adapted and which achieve a broad, dense canopy is encouraged for the main theme of the streetscape. Separating pedestrians from vehicular traffic can be accomplished through landscape areas and sidewalk alignment.

1. Use decomposed granite, exposed aggregate, and grouted riprap in place of decorative paving.
2. Plant palette should begin to incorporate more arid-type materials or desert adapted, as shown in [Section 8-1.100](#).

D. Transitional Arid Character

For areas of the city where the development pattern is medium to low, and the streetscape serves as a buffer between traffic and adjacent land uses, the transitional arid character classification is applied. Landscape materials should include native plants or plants

compatible with a desert environment. Special care should be given to protect existing vegetation and natural features that can be incorporated into the design.

1. Handset riprap and decomposed granite are to be the primary inorganic materials.
2. Plant palette shall consist of indigenous and desert-compatible materials (see [Section 8-1.100](#)).

E. Natural Character

A goal of the natural streetscape designation is to keep the streetscape compatible with the natural desert. For this reason, the applicant should select plants that are native to the Upper Sonoran desert and match densities to the existing and adjacent desert environment. The design elements for the Natural Character area are governed in part by the city's Environmentally Sensitive Lands Ordinance (ESLO). Refer to this ordinance for specific requirements on plant and materials selection – www.scottsdaleaz.gov/codes/eslo.

1. Native stone and indigenous decomposed granite are to be primary inorganic materials.
2. Plant palette is to consist of indigenous materials only, and shall conform to the native distribution patterns, densities, and maturity (see Chapter 10).

F. Blending of Abutting Character Areas

Where two different character areas join, a blending of the two categories should occur to prevent a marked difference between opposing sides of streets. These guidelines apply to all landscaped areas within the public rights-of-way. Areas between the rights-of-way and building setback lines are encouraged to use the guidelines as well. Transitional areas which abut Environmentally Sensitive Lands (or the Natural Character) should use native plants as the primary selection in order to strengthen the tie to the natural desert and to prevent the spread of invasive, non-native species into the natural areas.

8-1.100

RECOMMENDED PLANTS

8-1.101

DOWNTOWN AND URBAN CHARACTER

Refer to Appendix 8.1-A for Downtown Area recommended plants; other plants will be considered on an individual basis. The Downtown Guidelines contain recommended plants to be used in the Urban Character Area (www.scottsdaleaz.gov/projects/downtown).

8-1.102

SUBURBAN CHARACTER

A. TREES

BOTANICAL NAME	COMMON NAME
<i>acacia abyssinica</i>	Abyssinian Acacia
<i>bauhinia congesta</i>	Anacahuita
<i>dalbergia sissoo</i>	Sissoo
<i>eucalyptus citiodora</i>	Lemon Scented Gum
<i>eucalyptus erythrocorys</i>	Red Cap Gum
<i>eucalyptus torquata</i>	Coral Gum
<i>fraxinus uhdei</i>	Shamel Ash
<i>geijera parviflora</i>	Australian Willow
<i>pithecellobium flexicaule</i>	Texas Ebony
<i>ulmus parvifolia</i>	Evergreen Elm

B. SHRUBS

BOTANICAL NAME	COMMON NAME
<i>caesalpinia spp.</i>	Bird of Paradise
<i>calliandra californica</i>	Baja Fairy Duster
<i>dalea spp.</i>	Daleas
<i>dasyllirion spp.</i>	
<i>leucophyllum spp.</i>	Rangers/Sages
<i>ruellia peninsularis</i>	Desert Ruellia
<i>sophora secundiflora</i>	Texas Mountain Laurel
<i>yucca spp.</i>	

TRANSITIONAL ARID CHARACTER**8-1.103****A. TREES**

BOTANICAL NAME	COMMON NAME
<i>acacia aneura</i>	Mulga
<i>acacia smallii</i>	Sweet Acacia
<i>acacia stenophylla</i>	Shoestring Acacia
<i>cercidium spp.</i>	Palo Verdes
<i>chilopsis linearis</i>	Desert Willow
<i>eucalyptus papuana</i>	Ghost Gum
<i>eucalyptus spathulata</i>	Narrow Leaf Gimlet
<i>eucalyptus woodwardii</i>	Lemon Flowered Gum
<i>pithecellobium flexicaule</i>	Texas Ebony
<i>prosopis spp.</i>	Mesquites

B. SHRUBS

BOTANICAL NAME	COMMON NAME
<i>baccharis 'centennial'</i>	
<i>calliandra eriophylla</i>	Fairy Duster
<i>cordia parvifolia</i>	Little Leaf Cordia
<i>dalea spp.</i>	Daleas
<i>dasyllirion spp.</i>	
<i>hesperaloe spp.</i>	
<i>leucophyllum spp.</i>	Rangers/Sages
<i>nolina spp.</i>	
<i>ruellia peninsularis</i>	Desert Ruellia
<i>salvia clevelandii</i>	Chaparral Sage
<i>yucca spp.</i>	

8-1.200**LANDSCAPE GUIDELINES**

All streetscape designs must meet the following minimum requirements based upon the city's ordinances. (Refer to the most current COS Supplement to MAG Section 430 and related details for more specific information.)

8-1.201**MAINTENANCE RESPONSIBILITY**

Maintenance of landscape medians and rights-of-ways will be the responsibility of the developer, property owner, or a homeowners association for a given period of time (usually 3 years). For a Capital Improvements Project this period of time will be for one year after final inspection. This period will begin and end following inspections and acceptance of installation by a representative of Inspection Services and Capital Projects or an owner's representative from Parks and Grounds Management Division. It is the developer's responsibility to set up the inspections.

The maintenance responsibility of medians and rights of ways are to be stated on the final landscape plans submittal. Figure 8.1-1 below shows the standard landscape maintenance block. Any deviation from this standard requires city approval and shall be defined in a separately recorded document.

All landscape areas and materials, including those located in public rights-of-way shall be maintained in a healthy, neat, clean and weed-free condition. This shall be the responsibility of the _____.

(Property Owner, Developer or Homeowner's Association)

FIGURE 8.1-1. STANDARD LANDSCAPE MAINTENANCE BLOCK

8-1.202**MEDIAN WIDTHS**

Median specifications can be found in Section 5-3.103.

1. Median width is measured from back of median curb to back of median curb (inside to inside). The minimum width for a median is 4 feet. Within the city's Hillside Area, 8 feet is the minimum requirement.
2. Medians less than 4 feet in width will either be stamped concrete, exposed concrete or pavers; no plant material will be allowed.

8-1.203**PLACEMENT OF TREES AND SHRUBS**

For planting details of trees, cacti, shrubs, and groundcovers see the most current version of COS Supplement to MAG Specifications and Details for Public Works Construction – Details #2620, 2621, 2622 & 2623.

Trees should be located so that the expected mature tree canopy does not ultimately extend into the street right of way. Consider also the mature tree height and its potentially adverse effects on above-ground utilities or signage.

For Saguaro relocation procedures, see Section 10.300.

8-1.204**TREE QUANTITIES AND SIZES**

Trees should be provided at the rate of one tree per each 35 lineal feet of median length. The minimum size is 15 gallon with 50 percent to be provided as mature trees or larger (as defined in Article III of the Zoning Ordinance).

GRADING

1. Mounding should not be used in the areas designated as Downtown and Urban Character zones. Care should be taken when designing landscaping within the sight distance triangles. Mounds within sight distance easements must not exceed a height of 18 inches as measured above the final grade elevation. All mounding should blend with the adjacent existing terrain.
2. The maximum slope of any mounding shall be 4:1 (25%).
3. The finished landscape grade with decomposed granite should be smooth, uniform, and a minimum of 2 inches below the top of curb.

8-1.205

DECOMPOSED GRANITE

1. Size is to be 1/2-inch screened.
2. For installation see the most current COS Supplement to MAG Specifications and Details for Public Works Construction – Detail #2620-1.
3. A sample will be submitted, to a representative from Parks and Grounds Management Division, for approval prior to the contractor ordering and bringing it onto the site. Color to match what exists in the area.
4. Decomposed granite will be distributed uniformly to a depth of 2 inches covering the entire landscape area.

8-1.206

BOULDERS

Boulders are not acceptable for city of Scottsdale landscaped medians and rights-of-way per Risk Management – 480-312-5082.

8-1.207

PLANT SELECTION

All plant materials used in a median are required to come from the Arizona Department of Water Resources low water use plant list for the Phoenix Active Management Area. The selected plant materials are also to be consistent with the appropriate character areas described in [Section 8-1.100](#).

Public rights-of-way that are located in the Environmentally Sensitive Lands (ESL) Upper Desert and Hillside landforms must be landscaped with plants from the city of Scottsdale's Indigenous Plants for Environmentally Sensitive Lands list. This list is available in the city's One Stop Shop. Refer to the Scottsdale Revised Code Section 49-78 and 49-79, Scottsdale Landscape Ordinance, and the ESLO for additional specific plant selection requirements (www.scottsdaleaz.gov/codes).

8-1.208

HYDROSEEDING & NAOS RESTORATION

Seed mix shall be composed of native species as defined in the Environmentally Sensitive Lands Ordinance (www.scottsdaleaz.gov/codes/eslo).

8-1.209

IRRIGATION GUIDELINES

Refer to the city of Scottsdale's most current supplement to MAG Section 440 and related details for more specific information.

8-1.300

A. Approved Irrigation System Types

Drip system using rigid laterals.

B. Controllers

Place controllers in the center of the median, a minimum of 20 feet before the beginning of the turn bay.

C. Power Source

1. The contractor is responsible for initiating account and service connection.
2. If the power source cannot be placed within the median or the rights-of-way, a utility easement must be provided. This location is to be indicated and noted on the final irrigation plans and also inside of the controller cabinet.

D. Water Source

1. Show both the water source and location of the proposed tap on the final irrigation plans.
2. Contact Water Resources at 480-312-5650 for information on tapping into city waterlines.
3. The minimum source pressure required to operate the system must be noted on plans.
4. The water meter should be located within a median wherever possible.

E. Remote Control Electric Valves

1. Valves are to be of brass construction, and a minimum size of 1 inch.
2. An approved valve is Rainbird series GB.
3. Full Port ball valves must be installed in front of all control valves.
4. All direct buried control valve wiring shall be a minimum 14 gauge.

F. Back Flow Prevention Devices

1. Only reduced pressure assemblies will be used.
2. All backflow prevention devices will have a security enclosure.
3. A certified tester, recognized by the city of Scottsdale, must test backflow prevention devices before the city will accept responsibility for maintaining the system.

8-1.301**GENERAL IRRIGATION DESIGN CRITERIA**

1. The irrigation system is to be located entirely within the median. Sleeving from median to median is acceptable.
2. The contractor is responsible for initiating the account and having the water meter set.
3. Trees and shrubs should be valved separately.
4. The entire irrigation system must be independent of other users, i.e. landscape dedicated to the city of Scottsdale for maintenance is to have separate power and water meters from other irrigation systems.
5. Plans will indicate existing and design operating water pressure requirements.

8-1.302**FINAL PLAN SUBMITTAL**

Final submittal for irrigation plans must show details for controller, backflow preventer, enclosures, control valves, wye strainer, pressure regulator, valve boxes, trenching, backfill, flush caps, and emitters.

SIGHT DISTANCE

Any plant material installed in a questionable area (i.e. safety triangles, sight lines) will be identified by traffic engineering and removed by the contractor. Sight distance must be considered for vehicles entering and exiting the adjacent properties, as well as for vehicles using the abutting roadways.

A. Sight Distances & Safety Triangle

1. To determine sight distances, use the criteria specified in this manual (Section 5-3.110.D).
2. The sight line, as shown in Figure 5.3-26, shall be clearly indicated and delineated on the final landscape plan submittal.

B. Planting within the Sight Triangle

1. Shrubs planted within the sight triangle are to have a mature height of not more than 18 inches. Height will be from edge of pavement, and total height will include the height of any mounding.
2. Trees planted within the safety triangle are to have a canopy pruned to a height of 7 feet or greater upon installation. Height will be from edge of pavement, and total height will include the height of any mounding.

ALTERATIONS & AS-BUILTS

If field conditions require relocating a water meter, backflow prevention device, controller, valve, or any other major component of the irrigation system as shown on approved plans, contact Inspection Services at 480-312-5750 prior to any installation.

The contractor must provide an accurate set of as-built Mylar drawings to the Parks and Grounds Management representative prior to the final acceptance of a system.

SPECIFIC AREA DESIGN GUIDELINES

In circumstances where a special theme is desired, the city may designate specific design standards to be implemented on select streets. Contact the One Stop Shop at 480-312-2500 for more information.

SCOTTSDALE GATEWAYS

Scottsdale shares common boundaries with several municipalities. When entering Scottsdale from a neighboring community, it is helpful for residents and visitors to have a sense of arrival into the city. Through the use of a city limits identification system, those entering the city should be able to readily recognize their entrance into Scottsdale. The Gateways Map (refer to the city's General Plan Environmental Design Element – www.scottsdaleaz.gov/generalplan) shows the locations of city entrance points.

MEDIAN INSPECTION

1. Inform city Irrigation and Median Maintenance Supervisors of any proposed new median construction or construction occurring in existing city medians.
2. Arrange pre-construction meeting with the contractor to review approved plans, MAG requirements, testing, maintenance responsibility, etc.

8-1.400

8-1.500

8-1.600

8-1.700

8-1.800

3. Inspect the following items before and during construction for compliance with city approved plans and city addendums to MAG:
 - Water meter and backflow location
 - Controller type and location
 - Remote control valve type and location
 - Source of power (inside enclosure)
 - Type of pipe and trench depth
 - Laterals and trench depth
 - Emitters and flush pits
 - Sleeves under asphalt
 - Pressure check system
 - Backflow preventer and enclosure (Notify city of Scottsdale Cross Connection Control for inspection and testing)
 - Plant palette and location
 - Planting depth
 - Tree staking
 - Sight distance triangles
 - Pre-emergent
 - Decomposed granite
4. Perform walk-through with Irrigation and Median Maintenance staff after completion of work to begin warranty period (3 years typical).
5. Issue Maintenance Period Notification letter to permittee (encroachment permit) to start warranty period.
6. Perform final walk through with Irrigation and Median Maintenance staff at the end of the warranty period.
7. Issue the Final Letter of Acceptance to permittee to end the warranty period and begin city maintenance of median.

This section provides guidance for developing park master plans, identifies their review and approval process, and provides requirements for park designs. The design review of each park is done on an individual basis. These design standards and policies help assure that Scottsdale's parks and recreation facilities provide quality and safe experiences for its citizens.

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8-2.100 Park Master Plans

8-2.200 Park Design

GENERAL INFORMATION

8-2.000

A. Neighborhood Parks

Neighborhood Parks provide primary park services and facilities, which are easily accessible and available to local residents. They are typically between 7 and 20 acres, not intended for large group use, and serve from one block up to an entire neighborhood. Neighborhood parks are preferably located adjacent to elementary schools or neighborhood centers.

B. Community Parks

Community Parks provide a full range of centralized recreational activities for major portions of the city with capabilities of accommodating large group reservations. Generally, these parks feature a community center building designed to meet multi-generational recreation needs. They are typically between 20 and 80 acres, serving several neighborhoods or approximately 10,000 to 25,000 people. Community parks are preferably located in the center of several neighborhoods, adjacent to a middle school or high school where possible.

C. Specialty and Regional Parks

Specialty and Regional Parks provide specialized facilities and preserve significant unique features of the community, including environmentally sensitive areas. The size of these parks will vary as will the specific number of people served by these parks; however, the parks should be oriented to serve the entire community and beyond. Park locations will also vary depending on the dynamics of the park (e.g. park theme or mountain park).

PARK LOCATIONS

8-2.001

A. The General Plan

The Public Facility Element of the General Plan for Scottsdale provides the basis for identifying locations for the parks. Refer to www.scottsdaleaz.gov/generalplan. A copy of the Public Facility Element is available at the One Stop Shop.

B. Parks Master Plan – Vision 2010

The Parks Master Plan establishes park policy, delineates future park needs by acreage and facilities, and locates parks based on demographics. The Master Plan specifies standards to guide park development in Scottsdale. A copy of the Parks Master Plan can be obtained from the Parks Grounds Management Division.

8-2.100**PARK MASTER PLANS**

A master plan is developed for each park, and the Public Facility Element of the General Plan, in conjunction with the Parks Master Plan – Vision 2020, help to guide the planning of facilities for each park.

8-2.101**MUNICIPAL USE MASTER PLAN APPROVAL PROCESS**

1. Planning Consultant/Parks & Recreation Team
 - Prepares alternative development concepts
 - Conducts public input meetings with neighborhood and community
 - Develops a preliminary master development plan for presentation
2. Parks & Recreation Commission
 - Conducts a public hearing to review and recommend on the preliminary park master plan
3. Planning Consultant/Parks & Recreation Team
 - Prepares final park master plan from Parks & Recreation Commission recommendation
 - Makes application for municipal use permit to Planning Commission
4. Parks & Recreation Commission
 - Reviews the final park master plan and recommends action (approval or otherwise) to the Planning Commission and the City Council
5. Planning Commission
 - Reviews the municipal use permit and recommends action (approval or otherwise) to City Council, based on the recommended Final Park Master Plan
6. City Council
 - Reviews and approves, or rejects, the final park master plan and municipal use permit
7. Approved Park Master Plan

8-2.200**PARK DESIGN**

Park designs must be approved by the Development Review Board before any development occurs on the park site (after City Council Master Plan approval). Whenever possible, parks should be located adjacent to school sites to create a fluid joint use between the park and school facilities.

8-2.201**SIDEWALKS**

1. Designated multi-use paths will be a minimum of 12 feet in width. See Sections 5-7 and Section 5-8 for multi-use paths and bikeways.
2. Sidewalks utilized specifically for pedestrians will be a minimum of 8 feet in width.
3. All multi-use paths will be located a safe distance away from active courts or fields.
4. Concrete will be MAG “A” spec, 5-inch slump 3,000 psi, 6-inch deep or 4-inch deep with 6-inch turndowns.

PLAYGROUNDS**8-2.202**

1. Playgrounds must meet or exceed all current U.S. Consumer Products Safety Commission (CPSC), American Society of Test/Measurement (ASTM), Americans with Disabilities Act (ADA) and International Play Equipment Manufacturers Association (IPEMA) standards.
2. Upon completion/installation of new playground equipment, the installation will be inspected by a third party National Playground Safety Inspector (NPSI).
3. Ensure that playground equipment/play opportunities are available for pre-school children (2-5 years old) and school-age children (5-12 years old).
4. Install chilled drinking fountain(s) in close proximity to the playground, but preferably not closer than 25 feet due to the problems encountered with sand. Ensure that drinking fountains meet ADA guidelines by having a wheelchair accessible fountain installed at 34" AFF, (measured to the deck), and a standard height drinking fountain installed at 40" AFF. In addition, install a child-height drinking fountain at 28" AFF. Do not construct drinking fountains with ferrous metals whether protected by galvanization, paint or otherwise. Drinking fountains within 100 feet of playgrounds will have assessable sand traps installed on the drains. It would be more desirable to install the drinking fountains on a building than installing free-standing units. Chillers will be located within 24 inches of the drinking fountains, and no recirculating pumps will be allowed. Use copper water piping for the drinking fountains, and insulate chilled water tubing.
5. Metal playground slides are unacceptable.
6. Install appropriate transfer stations and resilient materials to meet ADA access standards for playground equipment.
7. Make sure that playground surface safety zones consist of double washed premium sand, with a minimum depth of 12 inches.
8. Make certain that there is some type of shade protection either from adjacent ramadas, (16 ft x 16 ft minimum) and/or non-deciduous trees on the perimeter of the playground (30 inch box).

SOFTBALL/BASEBALL FIELDS**8-2.203**

1. Ensure that all fields are lighted to meet all current Illuminating Engineering Society (IES) standards, and utilize effective shielding systems to reduce spill light off play areas.
2. Construct infields with an approved non-toxic organic binder, red color mix material especially prepared for ballfields. Material will be a minimum of 4 inches in compacted depth. Bind by crushed aggregate screenings down to 1/4" or 3/8" fine particles.
3. Fill home plate and mounds with a minimum of 2 inches of fine grey brick clay incorporated at a uniform rate with established infield red mix. Infields and outfield turf areas will consist of a Tif Hybrid Bermuda Grass.

COURT FACILITIES**8-2.204**

1. Make sure that all court facilities are lighted to meet all current IES standards. Tennis courts should also meet United States Tennis Association (USTA) standards.
2. Ensure that all tennis courts meet USTA standards. Concrete courts should be considered due to extended life in a desert environment.
3. Sand Volleyball courts should consist of Double Washed Mortar Premium Grade at a depth of 12 inches.
4. For wetting courts, provide water in the net standards with a Hunter series head in each standard. Also, use domestic water as a source instead of water from the irrigation

system. Make sure that all water piping is type L copper. And finally, control the water with a system timer that allows for watering times up to 15 minutes, and locks out the controls for a minimum of 30 minutes between activations. Activation will be by a 24 volt momentary contact switch mounted on a net standard or other pole.

8-2.205**IRRIGATION GUIDELINES**

Refer to the city of Scottsdale's most current supplement to MAG Section 440 and related details for more specific information.

8-2.206**LANDSCAPING**

For landscaping, use low-water use, drought-tolerant species. Plant material must be approved by Parks and Grounds Management Division staff prior to installation. Refer to the city of Scottsdale's most current supplement to MAG, Section 430, and related details for more specific information.

8-2.207**CONSTRUCTION MATERIAL**

1. Use steel, metal, aluminum, recycled material or approved equal for park fixtures and armadas. Wood will not be permitted. Roofing material needs to be 20-year guaranteed metal, standing seam with Kynar finish.
2. Between turf and landscaped areas, install headers consisting of concrete, brick, ultraviolet-treated vinyl, or metal.

8-2.208**SIGNAGE**

1. Place the standard park sign at the main entrance of every neighborhood and community park. The park sign mold can be obtained from the Scottsdale Parks Grounds Management Division.
2. Specialty parks may deviate from standard park signage with the approval from the Parks Grounds Management Division. A marquee meeting the city's Sign Ordinance may be acceptable upon the approval of Parks Grounds Management Division and obtaining a city sign permit.
3. Certify that all signage meets the Scottsdale Sign Ordinance. Ordinance information can be obtained at the One Stop Shop and www.scottsdaleaz.gov/codes.

8-2.209**PARKING**

1. Ensure that all parking meets ADA Guidelines and the city of Scottsdale's parking requirements stipulated in the Parks Master Plan and city zoning requirements.
2. Ensure that parking lots lights meet all current IES standards.
3. Plant non-deciduous trees (24-inch boxes minimum) adjacent to parking lots to provide shading. An acceptable ratio is 1 tree per every 15 parking stalls.

medians,
parks & trails

NON-PAVED TRAILS

8-3

This section addresses the planning, design, maintenance, and construction of trails within the city. The term “trails” refers to non-paved, non-motorized, shared-use trails, which are legally accessible by the general public.

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GENERAL INFORMATION

8-3.000

The city of Scottsdale's goal is to develop and maintain a citywide interconnecting network of trails to provide valuable recreation and transportation opportunities for city residents and visitors. Trails function as transportation links between schools, residential areas, parks, places of employment, shopping areas, and other areas of interest. Trails also provide hikers, walkers, joggers, equestrians, mountain bicyclists, and people with disabilities opportunities to improve health and fitness, spend time with family and friends, enjoy the natural environment, and escape the stress of everyday life.

Several trails plans must be consulted for identifying trail alignments within the city. The Trail Master Plan approved by the City Council in February 2004 identifies trail locations citywide (see www.scottsdaleaz.gov/trails/plan/). More detailed plans provide guidance for developing trails specifically within the McDowell Sonoran Preserve (see www.scottsdaleaz.gov/preserve/).

TRAIL CLASSIFICATIONS

8-3.001

A. Primary Trails

The management objective for Primary Trails is to provide both transportation and recreation links between residential areas, schools, businesses, parks, places of employment, and other areas of significant community activity. Primary Trails will typically experience the highest use levels. User groups include hikers, equestrians, and bicyclists. Motorized vehicles are only permitted for maintenance and emergency purposes. The trail surface may be comprised of either native soil or decomposed granite. Urban Trails have the greatest width of all trail classifications, and therefore accommodate leisurely side-by-side travel and easy passing for multiple user types. These trails are typically located within areas of relatively level topography.

B. Secondary Trails

The management objective for Secondary Trails is to provide secondary transportation and recreation links through areas such as washes, scenic and vista corridors, and other desert open space areas. Secondary Trails typically experience a lower level of use than Primary Trails. User groups include hikers, equestrians, and bicyclists. Motorized vehicles are only permitted for maintenance and emergency purposes, and where trail widths allow. Secondary Trails are narrower than Primary Trails; therefore, occasional single file travel by users may be required. These trails are typically located within areas of level to moderate topography.

C. Local Trails

The management objective for Local Trails is to provide access from neighborhood areas to Primary and Secondary Trails. Local Trails typically act as "feeder" trails to the more regional trail network, and share the same physical characteristics as Secondary Trails.

User groups include hikers, equestrians, and bicyclists. Motorized vehicles are only permitted for maintenance and emergency purposes, and where trail widths allow.

D. Neighborhood Trails

The management objective for Neighborhood Trails is to serve very localized areas, and provide close-to-home recreational opportunities. In most cases, Neighborhood Trails connect to Local Trails, which connect to Primary and Secondary Trails. Trail users create localized loops, which enable outdoor activities within close proximity to their homes; user groups include hikers, equestrians, and bicyclists. Motorized vehicles are only permitted for maintenance and emergency purposes, and where trail widths allow.

E. Preserve Primary Trails

The management objective for Preserve Primary Trails is to provide safe and enjoyable trail recreation opportunities within preserved open space areas of the city, while having a minimum impact on the surrounding environment. These trails typically provide connections between major trail access points and Preserve Secondary Trails. User groups include hikers, equestrians, and bicyclists. Certain user groups may be prohibited if deemed appropriate (see [Section 8-3.101](#)). Motorized vehicles with a wheelbase of less than 48 inches may be used for maintenance and emergency purposes only. These trails are typically located within areas of moderate to slightly more rugged topography. The installation of erosion control structures may be necessary along trail sections with steeper longitudinal slopes. Trail widths may occasionally be too narrow to allow side-by-side travel by users.

F. Preserve Secondary Trails

The management objective for Preserve Secondary Trails is to provide safe and enjoyable trail recreation opportunities within preserved open space areas of the city, while having a minimum impact on the surrounding environment. These trails typically serve as secondary routes emanating as spurs from Preserve Primary Trails. Certain user groups may be prohibited if deemed appropriate (see [Section 8-3.101](#)). Use may be limited to foot traffic only, as widths and grades may not permit the safe use by equestrians and mountain bicyclists. Motorized vehicles, excluding helicopters, may be unable to operate for maintenance or emergency purposes due to the narrow tread width. Preserve Secondary Trails traverse areas with rugged topography; therefore, longitudinal grades are steeper, more difficult, and require erosion-control structures. The trail tread is narrower than Preserve Primary Trails, thus requiring single file travel by users.

G. Interpretive Trails

The management objective for Interpretive Trails is to provide educational opportunities along a common theme. Education and interpretation can occur in a variety of forms including, but not limited to, signage and brochures. Use by equestrians and bicyclists are prohibited. Motorized vehicles are only permitted for maintenance and emergency purposes, and where trail widths allow. These trails are generally established in areas of gentle topography; therefore, longitudinal grades are easy to moderate. The trail tread should be wide enough to accommodate some side-by-side travel and two-way traffic. Barrier-Free standards may be achieved with additional improvements.

H. Barrier-Free Trails

The management objective of Barrier-Free Trails is to provide trail opportunities for persons with physical disabilities including mobility, visual, and hearing impairments. The design of Barrier-Free Trails should provide access to viewpoints, activity areas, and other points of interest, and should meet the standards of the ADA. Equestrians and bicyclists are not permitted on Barrier-Free Trails. Motorized vehicles (excluding electric wheelchairs and other types of mobility aids) are permitted only for maintenance and emergency purposes.

Caution must be exercised when using vehicles to avoid damaging hardened surfaces. These trails are generally established in areas that are flat with very gentle topography and level longitudinal grades. The trail tread is wide enough to accommodate side-by-side travel and two-way traffic, and is composed of a hardened or stabilized surface.

TRAIL DESIGN

8-3.100

The city's objective is to design, construct, and maintain trails that:

- Provide safe, non-motorized transportation links and/or close-to-home recreation opportunities,
- Provide legal public access to destination points and other areas of interest,
- Blend with the surrounding environment,
- Minimize impacts on the natural environment,
- Minimize impacts on adjacent landowners,
- Require minimum levels of maintenance.

DESIGN CONSIDERATIONS

8-3.101

A. Human Factors

Trails must be planned and constructed with the needs of the trail user in mind. Trail users tend to desire routes that access and connect areas of significant community activity such as schools, businesses, shopping areas, and parks, as well as other areas of interest such as viewpoints, water sources, natural areas, desert preserves, scenic and vista corridors, and interesting geologic features. Visual qualities are important to trail users; therefore, trails should be designed to blend with the surrounding environment. Views from the trail to the surrounding environment should also be considered. Trail users enjoy changes in scenery, thus the increasing demand for loop trails and trail networks that allow the user to return to the starting point without traveling the same trail twice. Loop trails also provide the comfort of knowing that the trail will return to the starting point, thus reducing the chance of anyone becoming lost. Trail users tend to favor the easiest, most obvious route. If the designated trail is not the easiest and most obvious, trail users will begin to create new, unauthorized trails.

B. Coinciding Easements

Trails are frequently located within common tracts and easements dedicated for other purposes such as drainage, flood control, public utility, natural area open space, and scenic and vista corridors. In situations where these common tracts and easements are wider than that needed for a trail easement, it may be advantageous to dedicate the same area of these coinciding common tracts and easements for the purposes of public trail use. This will increase the flexibility to properly lay out, design, and construct public trails, and will allow the trail to be positioned away from undesirable areas such as low-flow wash channels, areas of extreme topography, dense vegetation, critical animal habitats, and adjacent properties. This will also allow future realignment of the trail, should such a realignment become necessary. In cases where a separate trail easement is delineated within other easements or common tracts, it is extremely important that the alignment of the trail easement be reviewed on the ground to assure suitability.

C. Trail Viewshed

The line of sight from a trail to the surrounding landscape, and from the surrounding landscape to a trail, are important design considerations. Views from the trail to the surrounding landscape improve the quality of the trail users' experience; therefore, trails should be designed to provide users varying views of the surrounding area. However,

obscuring views of the trail from the surrounding landscape is also important, since adjacent landowners may not want to view the trail from their properties.

D. Native Plants

The design, construction, and maintenance of trails within the city of Scottsdale must take into account the city of Scottsdale Native Plant Ordinance (Section 7.500 of the city's Zoning Ordinance – www.scottsdaleaz.gov/codes/nativeplant). Trails should be aligned to avoid disturbance of, and have a minimum effect on the following plant species: whitethorn acacia, catclaw acacia, crucifixion thorn, hackberry, blue palo verde, foothill palo verde, desert willow, juniper, ironwood, cottonwood, mesquite, scrub oak, sugar sumac, Arizona rosewood, saguaro, barrel cacti, ocotillo, and soaptree yucca.

E. Sensitive Wildlife Habitat

Trail design and construction within natural desert park and preserve areas should be evaluated in terms of the effect that the trail will have on sensitive wildlife habitats. The Arizona Game and Fish Department should be consulted during the trail design process to assure that the trail will not have a negative impact on such resources. The best means of preventing negative impacts on wildlife is to simply avoid sensitive areas. Seasonal trail closures may be necessary in some situations.

F. Archaeological and Cultural Resources

Trail design and construction should be evaluated in terms of the effect the trail will have on archaeological and cultural resources. Such activities should be done in accordance with the city of Scottsdale Archeological Ordinance (www.scottsdaleaz.gov/codes/).

Potential options to prevent and mitigate damage to these resources include:

1. Altering the trail alignment to avoid archaeological and cultural resources.
2. Protecting the resources by utilizing methods to obscure them from view.
3. Mitigating the cultural resource, which involves removal and thorough documentation of the items by a professional archaeologist. The documentation of the resource may then be interpreted as part of the trail opportunity.

G. Design for Shared-Use

Trails within the city are open to all non-motorized uses unless otherwise stated. Decisions to prohibit any non-motorized use from trails must be based on coordinated planning efforts involving appropriate user groups and city staff. Characteristics that should be considered as part of this process include, but are not limited to, longitudinal and cross slopes, surface materials, line of sight, amount of use, sensitivity of surrounding environment, soil types, and native plant and animal habitats.

The following means of preventing potential user conflicts are based on methods identified in "Conflict on Multiple Use Trails" (Moore, 1994), and should be considered when planning, designing, constructing, and maintaining shared-use trails:

- Separate user types at trailheads and along the first, most crowded, stretches of trail.
- Provide adequate sight distances.
- Build trails wide enough to accommodate expected levels and types of use.
- Build and maintain trails wide enough for safe passing and/or provide periodic turnouts.
- Design trails to control speeds where necessary by varying the trail surface and avoiding long, straight downhill stretches.
- Provide adequate trailhead facilities for all user types.

TRAIL LOCATION

8-3.102

Location work must begin early in the trail design process and be completed prior to construction. The amount and level of work that is required varies depending on the type of trail being designed and the terrain on which the trail is being constructed. The necessary steps to properly layout the trail include the following: Reconnaissance, Grade, Drainage, and Staking/Flagging (see Paragraphs A through D below).

A. Reconnaissance

The reconnaissance process includes the identification and evaluation of alternative routes, which leads to final selection of the best possible route to meet the established objectives. Application of sound principles of trail location, alignment, and grade will minimize future operation and maintenance problems.

The first step is to examine the most recent topographic maps and aerial photos of the area to identify significant landforms, drainage patterns, and vegetation. The next step, for which there is no substitute, is to walk the area and examine potential routes. Conduct a systematic study of the area by walking various routes and viewing the area from different vantage points. Control points, which are features that are favorable for or inhibit trail construction, should be identified through this process. The control points will help to identify the best possible route, with the understanding that situations may exist where trails must pass through negative control points.

Control points that are favorable for trail construction:

- Existing road crossings (underpasses, overpasses, and intersections with traffic lights or stop signs)
- Natural wash crossings
- Ridgelines
- Hillside benches
- Areas of light vegetation
- Scenic vistas
- Areas of well drained soils
- Good trailhead access

Control points that inhibit trail construction and should be avoided:

- Wet areas and poorly drained flat areas
- Sensitive wildlife habitats
- Wash bottoms
- Areas adjacent to sources of excessive noise such as airports
- Areas adjacent to plants that are poisonous to horses such as oleanders
- Steep rocky slopes
- Unstable or fragile soils
- Abrupt elevation changes
- Bluffs, ledges, and cliffs except where featured as scenic resources
- Frequent wash crossings
- Locations requiring bridges or culverts
- Areas of heavy or fragile vegetation
- Areas requiring switchbacks
- Excessively long, straight sections
- Areas of archeological/cultural sensitivity
- Lightning-prone areas
- Unsafe or uncontrolled road crossings
- Known habitats of threatened or endangered plant or animal species

B. Grade

The degree to which a trail rises or falls over a linear distance is an important factor in determining the length of the trail, level of difficulty, appropriate user types, and drainage and maintenance requirements. Occasional fluctuations in the trail grade should be considered to provide variation for trail users and to facilitate proper drainage. Frequent or drastic changes in grade should be avoided. The grade line between control points can be

plotted on paper to determine if switchbacks or other special features will be needed to sustain a certain grade. On moderate to steep side slopes a periodic reverse in the grade should be included to create dips for drainage purposes. When grade dips are included in initial trail construction, the need for waterbars is eliminated.

C. Drainage

Proper drainage of surface water is the most important factor in design, construction, and maintenance of trails. Surface erosion resulting from improper drainage will have a detrimental impact on the trail surface, causing damage to the natural environment and increasing maintenance requirements. The potential for erosion depends on three factors: soil type, velocity of water on the trail, and the distance water travels down the trail. Alteration of any of these factors can reduce the potential for erosion. Proper outslowing of the trail tread and the installation of grade dips or water bars will help decrease the potential for erosion of the trail surface. If distances allow, grade dips are preferred over waterbars. Existing drainage patterns of the surrounding area, such as concentrated drainage channels, must be maintained. Attempts to alter the existing drainage patterns will have a negative effect on the natural environment, and will most likely result in severe damage to the trail.

D. Staking/Flagging

Stakes or flags act as a guide so that the alignment, grade, and distances can be easily followed during construction. A clinometer, topographic map, compass, measuring tape, and notebook are all necessary tools. Proper location of the flag line is easily accomplished with three people acting as surveyor, rod holder, and recorder. Stakes or flags should be located along the trail centerline with the location of dips, walls, and other special structures indicated with color-coded flagging. The trail alignment should pass through control points that are favorable for trail construction, and avoid control points which will inhibit trail construction. Normally, trail alignments follow the contours of the land and consist of a series of gently sweeping curves. Long straight segments with sharp angular turns should be avoided.

8-3.200

8-3.201

TRAIL CLASSIFICATIONS

PRIMARY TRAILS

A. Grade

Maximum sustained grade should not exceed 8 percent. A maximum grade of 10 percent may be used for wash crossings, grade dips, and other trail segments to avoid impassable areas for a distance not to exceed 50 linear feet.

B. Tread

Primary trail widths must be 8 feet in built environments, and may narrow to no less than 4 feet in un-built environments. The trail tread should be comprised of native soils in undisturbed desert areas, and decomposed granite in areas that have been graded, landscaped, or will otherwise remain significantly unnatural. Compaction of a native soil tread surface may be necessary to prevent damage from use and to increase resistance to erosion. If decomposed granite is used, it must be ¼-inch minus Madison Gold (or similar), wetted and compacted to a 4-inch depth. A soil stabilizer may be added to the decomposed granite according to manufacturers' specifications. The trail tread must be smooth and free of all obstacles. The trail tread must be delineated from the surrounding terrain. For example, utilizing decomposed granite of a different size or color in the surrounding landscape will help distinguish the trail tread. The location of landscape plants, fences, and other physical barriers can also be used to delineate the trail.

C. Vegetation Clearance

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance (see www.scottsdaleaz.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. In areas where new landscaping is to be installed, trees, cacti, and other spiny plants must be planted at least 5 feet from the trail tread.

D. Drainage

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures such as water bars or grade dips may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail, causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off both sides of the trail and prevent pooling.

E. Easement Widths and Setback from Street

Primary Trails must be contained in a minimum 15-foot-wide trail easement. In situations where a trail easement overlaps with common tracts or easements dedicated for other purposes, it may be beneficial to dedicate the entire width for public trail purposes (see [Section 8-3.101](#) for more detail). For trails along streets, the minimum distance from back of curb to the edge of the trail is 25 feet along expressways and parkways, 15 feet along arterials, 10 feet along collectors, and the maximum distance feasible in all other locations.

SECONDARY TRAILS

8-3.202

A. Grade

Maximum sustained grade should not exceed 10 percent. A maximum grade of 15 percent may be used for wash crossings, grade dips, and other trail segments to avoid impassable areas for a distance not to exceed 100 linear feet.

B. Tread

Secondary trail widths must be 4 feet in both built and un-built environments. The trail tread should be comprised of native soils in undisturbed desert areas, and decomposed granite in areas that have been graded, landscaped, or will otherwise remain significantly unnatural. Compaction of a native soil tread surface may be necessary to prevent damage from use and to increase resistance to erosion. If decomposed granite is used, it must be ¼-inch minus Madison Gold (or similar), wetted and compacted to a 4-inch depth. A soil stabilizer may also be added to the decomposed granite according to manufacturers' specifications. The trail tread must be smooth and free of all obstacles. The trail tread must be delineated

from the surrounding terrain. For example, utilizing decomposed granite of a different size or color in the surrounding landscape will help distinguish the trail tread. The location of landscape plants, fences, and other physical barriers can also be used to delineate the trail.

C. Vegetation Clearance

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance (see www.scottsdaleaz.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. In areas where new landscaping is to be installed, trees, cacti, and other spiny plants must be planted at least 5 feet from the trail tread.

D. Drainage

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures such as water bars or grade dips may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling.

E. Easement Width and Setback from Street

Secondary Trails must be contained in a minimum 25-foot-wide trail easement. In situations where a trail easement overlaps with common tracts or easements dedicated for other purposes, it may be beneficial to dedicate the entire width for public trail purposes (see [Section 8-3.101](#) for more detail). Secondary Trails must be located the maximum distance feasible from the edge of the street.

8-3.203

LOCAL TRAILS

A. Grade

Maximum sustained grade should not exceed 10 percent. A maximum grade of 15 percent may be used for wash crossings, grade dips, and other trail segments to avoid impassable areas for a distance not to exceed 100 linear feet.

B. Tread

Local trail widths must be 4 feet in a built environment, and can narrow to 2 feet in more natural, un-built settings. The trail tread should be comprised of native soils in undisturbed desert areas, and decomposed granite in areas that have been graded, landscaped, or will otherwise remain significantly unnatural. Compaction of a native soil tread surface may be necessary to prevent damage from use and to increase resistance to erosion. If

decomposed granite is used, it must be ¼-inch minus Madison Gold (or similar), wetted and compacted to a 4-inch depth. A soil stabilizer may also be added to the decomposed granite according to manufacturers' specifications. The trail tread must be smooth and free of all obstacles. The trail tread must be delineated from the surrounding terrain. For example, utilizing decomposed granite of a different size or color in the surrounding landscape will help distinguish the trail tread. The location of landscape plants, fences, and other physical barriers can also be used to delineate the trail.

C. Vegetation Clearance

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance (see www.scottsdaleaz.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. In areas where new landscaping is to be installed, trees, cacti, and other spiny plants must be planted at least 5 feet from the trail tread.

D. Drainage

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures such as water bars or grade dips may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling.

E. Easement Width and Setback from Street

Local Trails must be contained in a minimum 15-foot-wide trail easement. In situations where a trail easement overlaps with common tracts or easements dedicated for other purposes, it may be beneficial to dedicate the entire width for public trail purposes (see [Section 8-3.101](#) for more detail). Local Trails must be located the maximum distance feasible from the edge of the street.

NEIGHBORHOOD TRAILS

8-3.204

A. Grade

Maximum sustained grade shall not exceed 10 percent. A maximum grade of 15 percent may be used for wash crossings, grade dips, and other trail segments to avoid impassable areas for a distance not to exceed 100 linear feet.

B. Tread

Neighborhood trail widths are typically 2 feet in width, but may be widened to 4 feet in areas of higher use. The trail tread is typically comprised of native soils. Compaction of a native soil tread surface may be necessary to prevent damage from use and to increase resistance to erosion. The trail tread must be smooth and free of all obstacles. The trail tread must be delineated from the surrounding terrain. For example, the location of landscape plants, fences, and other physical barriers can be used to delineate the trail.

C. Vegetation Clearance

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance (see www.scottsdaleaz.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. In areas where new landscaping is to be installed, trees, cacti, and other spiny plants must be planted at least 5 feet from the trail tread.

D. Drainage

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures such as water bars or grade dips may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling.

E. Easement Widths and Setback from Street

Neighborhood Trails must be contained in a minimum 15-foot-wide trail easement. In situations where a trail easement overlaps with common tracts or easements dedicated for other purposes, it may be beneficial to dedicate the entire width for public trail purposes (see [Section 8-3.101](#) for more detail). Neighborhood Trails must be located the maximum distance feasible from the edge of the street.

8-3.205**PRESERVE PRIMARY TRAILS****A. Grade**

Maximum sustained grade should not exceed 15 percent. A maximum grade of 25 percent is allowed for wash crossings, grade dips, and other trail segments to avoid impassable areas for a distance not to exceed 100 linear feet. Switchbacks may be utilized when surrounding terrain has a side slope of 20 to 45 percent. Switchbacks supported by retaining walls may be utilized when surrounding terrain has a side slope up to 55 percent.

B. Tread

Preserve Primary trail widths must be 2 feet with 12-foot cleared shoulders on each side of the trail tread. The trail surface should be native soil and must be smooth and free of major obstacles. All stumps and root balls within the tread surface must be completely removed.

C. Vegetation Clearance

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance (see www.scottsdaleaz.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. This distance may need to be increased on the uphill side of trails that traverse steep hillsides. This will prevent pieces of cacti from falling onto the trail tread and creating a safety hazard.

D. Drainage

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling.

E. Easement Width

Preserve Primary Trails are typically located within large open space areas controlled by the city. In situations where these trails must be located within easements, the easement width must be a minimum of 100 feet.

PRESERVE SECONDARY TRAILS**8-3.206****A. Grade**

Maximum sustained grade should not exceed 20 percent. A maximum grade of 30 percent is allowed for wash crossings, grade dips, and other trail segments to avoid impassable areas for a distance not to exceed 100 linear feet. Switchbacks may be utilized when surrounding terrain has a side slope of 20 to 45 percent. Switchbacks supported by retaining walls may be utilized when surrounding terrain has a side slope up to 55 percent.

B. Tread

Preserve Secondary trail widths must be 2 feet, with NO cleared shoulders. The trail surface should be native soil and must be smooth and free of major obstacles. All stumps and root balls within the tread surface must be completely removed.

C. Vegetation Clearance

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance (see www.scottsdaleaz.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 10 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. This distance may need to be increased on the uphill side of trails that traverse steep hillsides. This will prevent pieces of cacti from falling onto the trail tread and creating a safety hazard.

D. Drainage

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling.

E. Easement Width

Preserve Secondary Trails are typically located within large open space areas controlled by the city. In situations where these trails must be located within easements, the easement must be a minimum of 100 feet wide.

8-3.207**INTERPRETIVE TRAILS**

Interpretive Trails differ from other trails because their primary function is to provide educational opportunities for trail users. Education and interpretation can occur in a variety of forms including signage and/or brochures. This manual contains only general guidelines for the design and construction of Interpretive Trails.

A. Grade

Maximum sustained grade should not exceed 10 percent. A maximum grade of 15 percent is allowed for wash crossings, grade dips, and other trail segments to avoid impassable areas for a distance not to exceed 100 linear feet. Switchbacks may be utilized when surrounding terrain has a side slope of 20 to 45 percent. Switchbacks supported by retaining walls may be utilized when surrounding terrain has a side slope up to 55 percent.

B. Tread

Interpretive trail widths must be 4 feet to 6 feet. The trail tread should be comprised of native soils in undisturbed desert areas, and decomposed granite in areas that have been graded, landscaped, or will otherwise remain significantly unnatural. Compaction of a

native soil tread surface may be necessary to prevent damage from use and to increase resistance to erosion. If decomposed granite is used, it must be ¾-inch minus Madison Gold (or similar), wetted and compacted to a 4-inch depth. A soil stabilizer may also be added to the decomposed granite according to manufacturers' specifications. The trail tread must be smooth and free of all obstacles. The trail tread must be delineated from the surrounding terrain. For example, utilizing decomposed granite of a different size or color in the surrounding landscape will help distinguish the trail tread. The location of landscape plants, fences, and other physical barriers can also be used to delineate the trail.

C. Vegetation Clearance

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance (see www.scottsdaleaz.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 8 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. This distance may need to be increased on the uphill side of trails that traverse steep hillsides. This will prevent pieces of cacti from falling onto the trail tread and creating a safety hazard.

D. Drainage

The trail surface must have a cross slope of 3 to 5 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The installation of erosion control structures may be required. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, as opposed to the side slope of a hill, the trail surface should be crowned to drain water off the trail and prevent pooling.

BARRIER-FREE

Barrier-free Trails are designed to provide opportunities for persons with physical disabilities including mobility, visual, and hearing impairments, and shall meet the standards of the ADA. This manual contains only general guidelines for the design and construction of Barrier-free Trails.

A. Grade

Barrier-free trails must be designed with the least possible longitudinal slope. Specific grade requirements shall comply with the ADA.

B. Tread

Barrier-free trail widths must be a minimum of 8 feet. There are many varieties of accessible surface materials available. Materials should be selected to achieve the maximum level of accessibility practicable according to the desired recreation experience

8-3.208

and the natural setting. The chosen surface must be stable, firm, and slip resistant. The material must match the surrounding environment. Specific surface requirements shall comply with the ADA.

C. Vegetation Clearance

Trails should be designed to have a minimum impact on plants identified for protection in the Native Plant Ordinance (see www.scottsdaleaz.gov/codes/nativeplant). Trail alignments that avoid and have the least impact on surrounding vegetation are preferred. If the trail must pass within an unacceptable distance to any plants, the preference is to relocate the plants rather than destroy them.

Vegetation may not exceed a mature height of 3 feet within a 3-foot distance of the trail tread. Vertical clearance must be at least 8 feet above the trail tread. This in no way implies that the trail corridor should be devoid of plants. Low growing desert shrubs such as bursage and brittlebush present no hazard to trail users; therefore, are acceptable to have within the clearing limits. The purpose of the vegetation clearing limits is to keep taller, potentially more dangerous plants such as thorny trees and larger cacti a safe distance from the trail. All remaining roots and stumps must be grubbed out of the trail surface to provide a smooth tread. No teddy bear cholla may be located within 3 feet of the trail tread. This distance may need to be increased on the uphill side of trails that traverse steep hillsides. This will prevent pieces of cacti from falling onto the trail tread and creating a safety hazard.

D. Drainage

The trail surface must have a cross slope of 1 to 3 percent. This is critical in preventing water from pooling on and channeling down the trail. If the trail traverses the side slope of a hill, the cross slope of the trail surface must be downward from the uphill to the downhill edge of the trail (outslope). This will allow surface water to drain off the edge of the trail rather than running down the length of the trail. The cross slope of such a trail tread must NOT be downward from the downhill to the uphill edge of the trail (inslope). Such a scenario will result in water channeling down the length of the trail causing extreme levels of erosion. If the trail is located on level ground, the trail surface should be crowned to drain water off the trail and prevent pooling. The longitudinal slope of barrier-free trails must be kept to the minimum standard, which makes the installation of erosion control structures unnecessary.

E. Additional Specifications

Support facilities for Barrier-free Trails, such as signage, restrooms, benches, and parking areas must be constructed to meet accessibility standards.

8-3.300

TRAIL CONSTRUCTION

8-3.301

TREAD CONSTRUCTION

A. Surface Materials

Trail surface materials must correspond to the specification for the appropriate trail classification under [Section 8-3.200](#).

B. Cross Slope

The cross slope, which is the slope of the tread surface perpendicular to the longitudinal slope, is a critical factor in the design, construction, and maintenance of trails. The cross slope allows surface water to drain off the side of the trail rather than along the longitudinal slope. The three primary types of cross slopes are outslope, inslope, and crowned.

Outsloped and insloped trail surfaces typically occur on trails that traverse the side slope of a hill, and a crowned trail surface is typically found on trails that travel across relatively level ground. Refer to Figure 8.3-1 below.

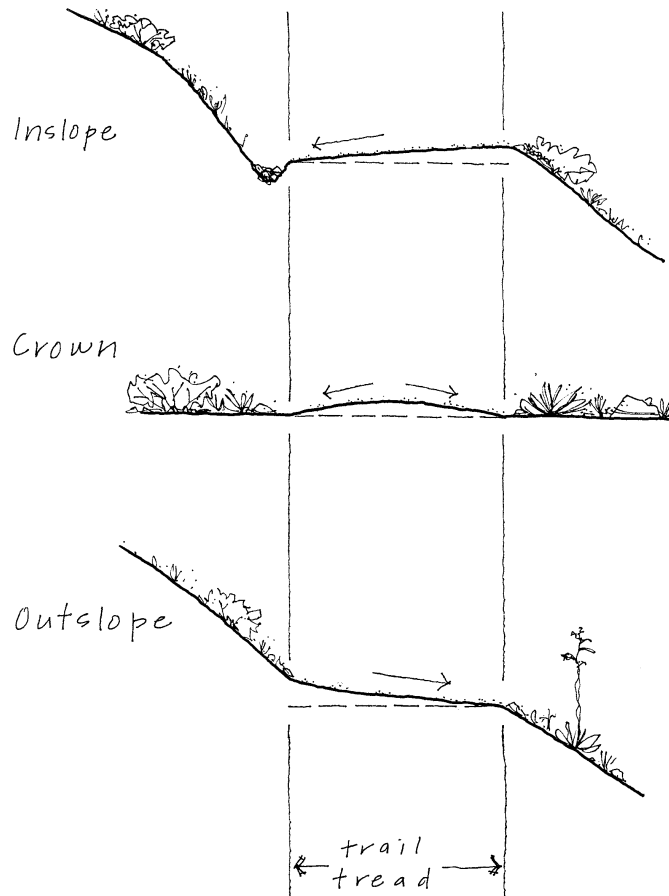


FIGURE 8.3-1. CROSS SLOPES

1. Outslope

Outslope is the most common type of cross slope used on trails that traverse the side slopes of hills, and occurs when the trail surface slopes downward from the uphill to the downhill edge of the trail. Standard outslopes range from 3 to 5 percent, depending on the trail classification.

2. Inslope

Inslope is the most infrequent variety of cross slope used on trails that traverse the side slopes of hills, and occurs when the trail surface slopes downward from the downhill to the uphill edge of the trail. Insloped trails are discouraged and only recommended when used as a component of switchback turns. Inslopes must be used in conjunction with rock-lined swales that collect the water and channel it away from the trail. The improper use of an insloped trail surface will cause extreme erosion to the trail surface and the surrounding environment; therefore, should not be built without consulting the city Trails Coordinator.

3. Crowned

A crowned surface is most commonly used on trails that traverse relatively level ground. A crowned trail surface slopes downward from the centerline to each outside edge for the purpose of preventing surface water from pooling on the trail surface. The slopes from the centerline to each edge should be 5 percent.

C. Backslope

The backslope is the area from which material is excavated on the uphill side of the trail tread. Backslopes range from steep to gentle depending on the side slope of the hill and the characteristics of the soil. As a general rule, the backslope cannot be steeper than the soil's ability to remain in place under typical climatic conditions. Riprap on moderate backslopes and retaining walls on steeper backslopes may be needed to stabilize the backslope in areas with steep side slopes or unstable soils. The use of retaining walls to support the backslope will require excavating less material. Refer to Figure 8.3-2 below.

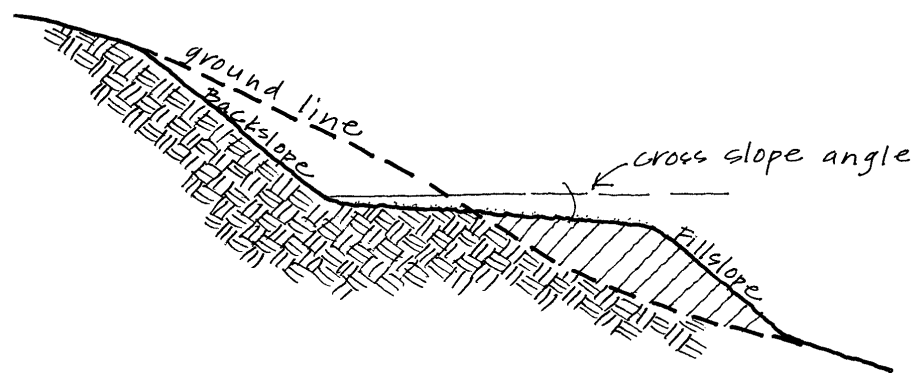


FIGURE 8.3-2. TYPICAL TRAIL PROFILE

D. Fillslope

Adding material to build up and support the downhill edge of the trail tread creates the fillslope. The material removed as part of the backslope or from nearby borrow pits is often used in the fillslope. Riprap on moderate fillslopes and retaining walls on steeper fillslopes may be needed to support the fillslope in areas with steep side slopes or loose soils. The fillslope should be revegetated, following construction, to regain its natural appearance and to reduce the potential for erosion. Refer to [Figure 8.3-2](#).

E. Typical Trail Cross-sections

Refer to [Figure 8.3-3](#) for examples of trail construction for various side slopes.

1. Full Bench

Full bench construction involves the greatest amount of soil removal, but provides the most stable trail surface. In this type of construction, soil is removed from the backslope and cast down the hill. The excavated material is not used as fill to support the trail tread. Instead, the entire trail tread is supported by solid mineral soil. Full bench construction is best suited for trails on steep side slopes greater than 50 percent because fill will erode easily.

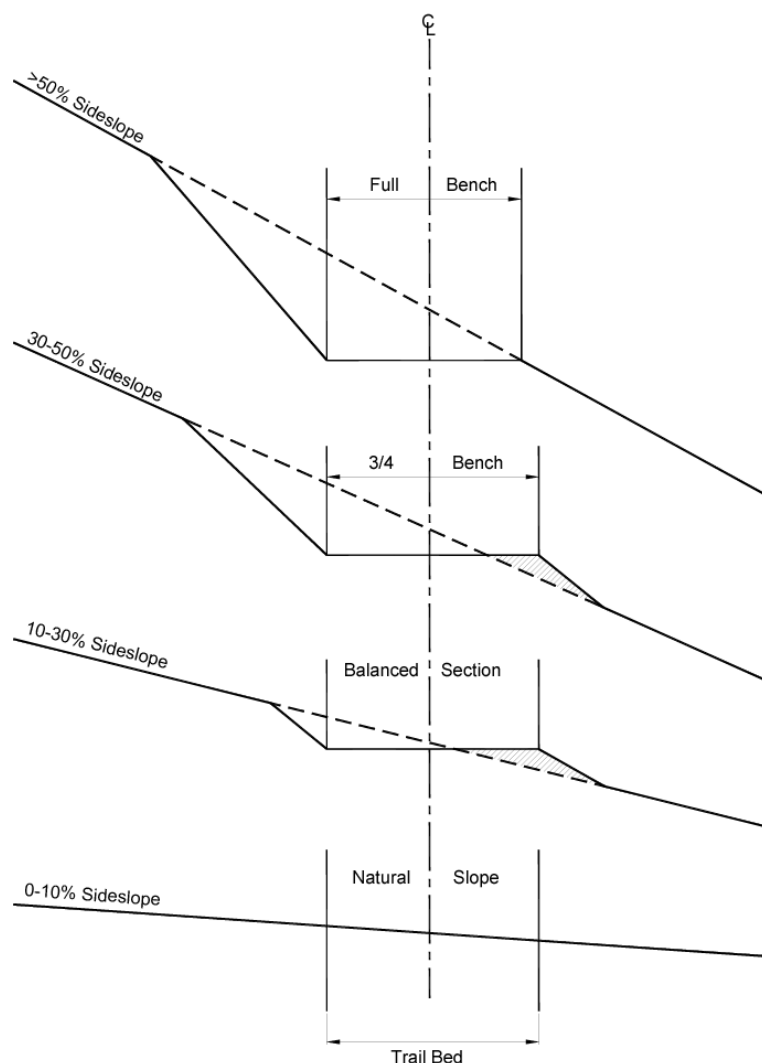


FIGURE 8.3-3. TYPICAL TRAIL CROSS SECTIONS

2. 3/4 Bench

This type of trail construction should be used on side slopes of 30 to 50 percent. The soil excavated from the backslope should be used for the fillslope. The fillslope should represent the downhill $\frac{1}{4}$ of the trail width. The fillslope should be revegetated to restore its natural condition and reduce the potential for erosion.

3. Balanced Section

Balanced section trail construction should be utilized on side slopes of 10 to 30 percent. The soil excavated from the backslope should be used for the fillslope. The fillslope should represent the downhill $\frac{1}{2}$ of the trail width. The fillslope should be revegetated to restore its natural condition and reduce the potential for erosion.

4. Natural Slope

Natural slope construction is used when side slopes are less than 10 percent; it involves no cutting or filling, resulting in no backslope or fillslope.

8-3.302

VEGETATION CLEARANCE

Vegetation clearance is the removal of vegetation within specified clearing limits, see [Section 8-3.200](#) for specifications for each trail classification. The primary goal is to provide the specified clearance while maintaining the maximum amount of vegetation and the natural characteristics of the area. Trails shall be aligned to prevent disturbance to plants identified in the Native Plant Ordinance (see www.scottsdaleaz.gov/codes/nativeplant). The trail should be aligned to avoid large-scale removal of native plants not covered by the Native Plant Ordinance.

When branches must be removed, pruning shall comply with ANSI Standard #A300, otherwise known as the three-cut pruning method:

- One partial cut from the underside of the branch 6 to 8 inches from the trunk,
- A second cut from the top of the branch above the first cut to remove the branch, and
- The third cut to remove the stub.

Be sure not to cut into the branch collar, as this will damage the tree and slow the healing process. Chemical sealants should not be applied to native trees. Cholla and prickly pear cacti should be trimmed at the segment joints. Plants that must be completely removed should be cut as close as possible to the ground surface and dispersed in areas not clearly visible from the trail, or completely removed from the site. Refer to Figure 8.3-4 below.

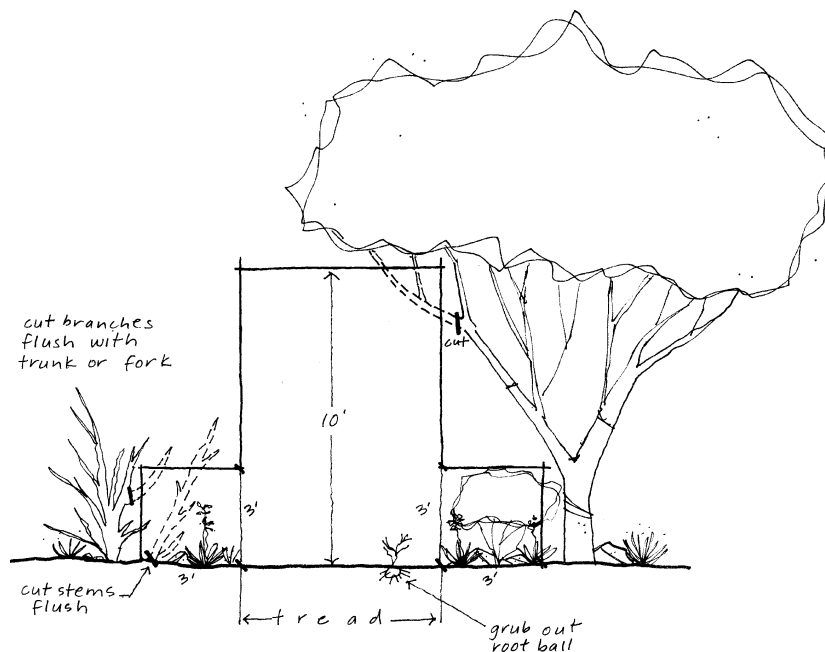


FIGURE 8.3-4. VEGETATION CLEARANCE

8-3.303

SURFACE WATER CONTROL

The proper control of surface water is a crucial element in trail design, construction, and maintenance. Improper control will most likely have a negative effect on the surrounding environment, and will result in damage to the trail that can be very expensive to repair. The need for surface water control structures depends on many different factors including, but not limited to soil type, longitudinal and cross slopes, and existing drainage patterns. The most effective time to address surface water control issues is during initial trail design and construction.

A. Grade Dips

Grade dips are short segments of trail with a grade opposite to the prevailing longitudinal grade of the trail. They are most effective when installed during new trail construction, and sited to take advantage of natural drainage patterns. The low point of the dip must be outsloped at the maximum percentage permitted for the given trail classification to assure that water will flow off and away from the trail. A rock apron may need to be constructed where the water flows out of the dip to prevent excessive erosion. Grade dips are generally more effective than waterbars, require less maintenance, and are more suitable for equestrians and mountain bicyclists. Refer to Figure 8.3-5 below.

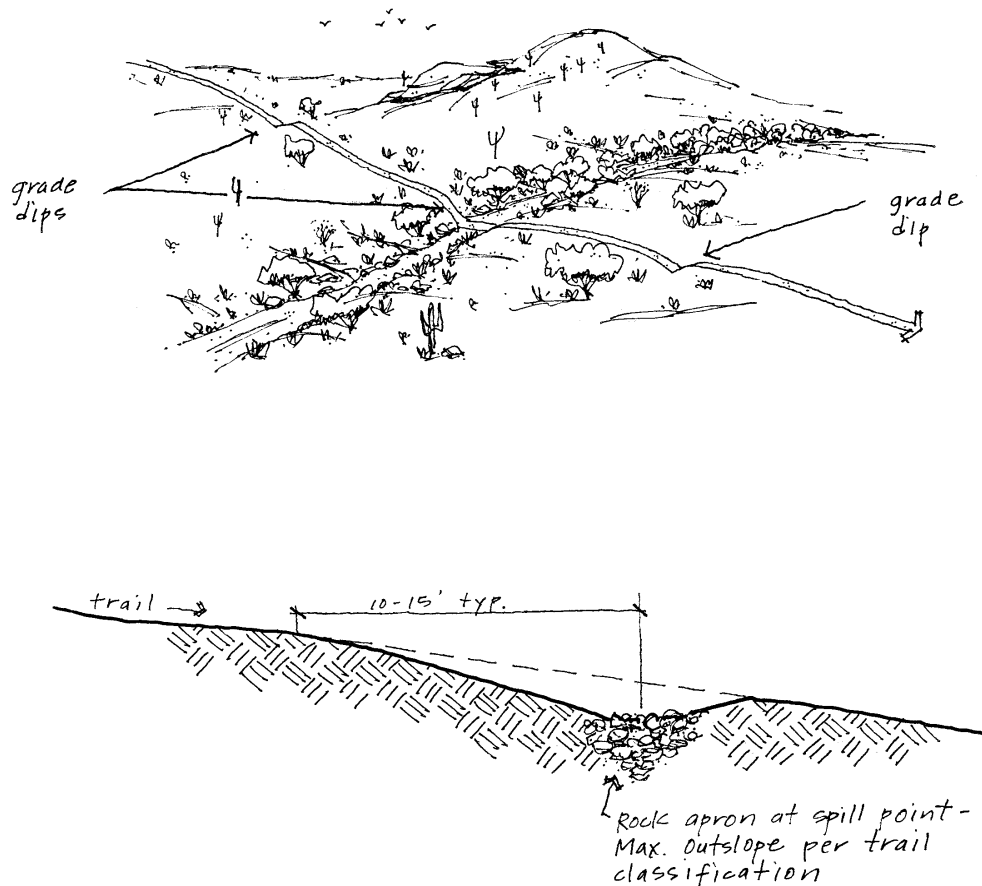


FIGURE 8.3-5. GRADE DIPS

B. Waterbars

Waterbars are native rocks or logs embedded in the trail surface at a 45-degree angle to the longitudinal slope for the purpose of directing surface water off the trail. Waterbars should extend at least 1 foot beyond each edge of the trail tread to ensure that water is diverted completely. Use fill material to build up the downhill side of the waterbar. Construct a drain ditch leading off the edge of the trail to ensure that runoff flows away from the trail. The drain should be at least 1 foot wide and 8 inches deep. Rocks should be placed in the bottom of the drain ditch to lessen the amount of erosion. Place additional rocks, logs, brush, or other debris in locations that will prevent trail users from detouring

around the waterbar. Waterbars are not the preferred drainage structures on trails with large amounts of equestrian and mountain bicycle use. Grade dips are more appropriate in such situations.

1. Rock Waterbar

This type of waterbar is constructed by embedding large rectangular shaped rocks into the trail tread at a 45-degree angle to a depth roughly half their height. Rocks must be large enough not to be knocked out by trail users and to effectively channel water off the trail. Rocks must be arranged in a shingle fashion, tightly overlapping each other towards the downhill side. Compact small rocks and fill around the base to ensure solid placement. Refer to Figure 8.3-6 below.

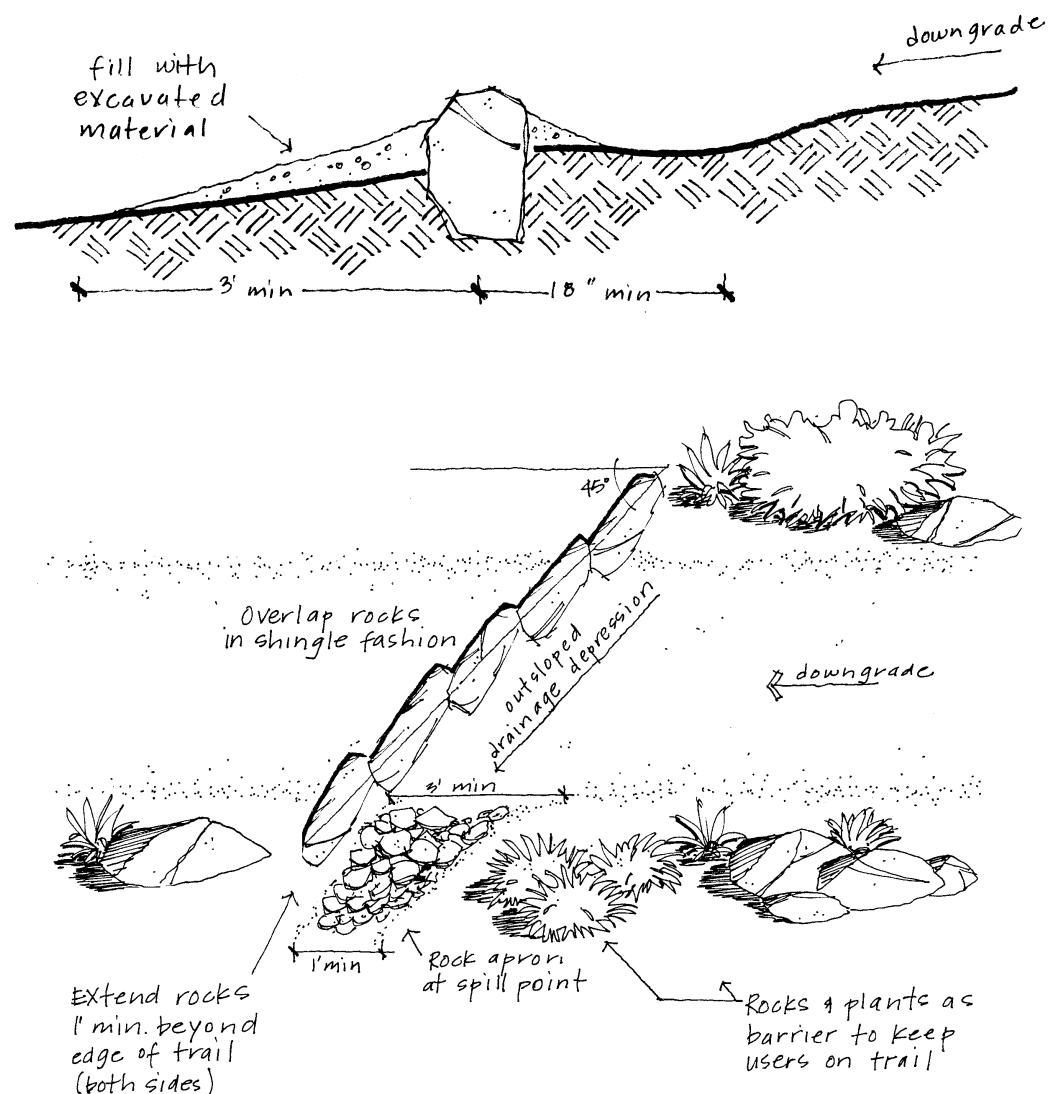


FIGURE 8.3-6. ROCK WATERBAR

2. Log Waterbar

A log waterbar is constructed by embedding solid, bark-free, rot-resistant timber into the trail surface at a 45-degree angle. Creosote-treated railroad ties or telephone poles are not acceptable for use as waterbars. Logs must have a minimum of an 8-inch diameter and be embedded halfway into the trail surface. Log waterbars must be secured with two 18-inch-long, ½-inch-diameter pieces of rebar. Drill a 7/16-inch hole through the log, 8 inches from each end. Place the log in the desired location and drive the rebar through the holes into the trail surface until flush with the log surface. The Trails Planner must approve the use of log waterbars. Refer to Figure 8.3-7 below.

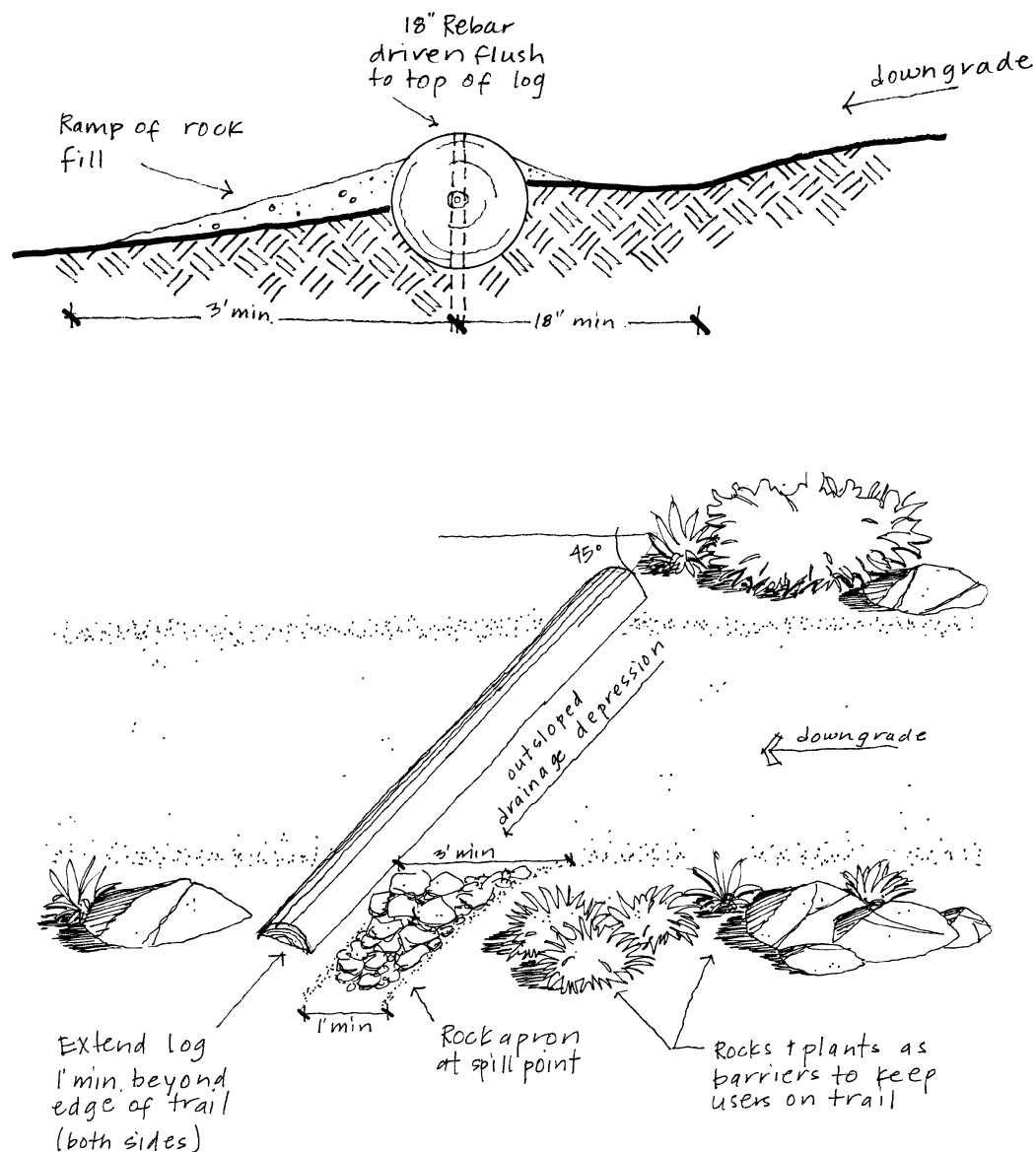


FIGURE 8.3-7. LOG WATERBAR

C. Culverts

In desert environments, most watercourses flow only seasonally; therefore, culverts are usually not necessary. Culverts tend to be maintenance intensive and can detract from the aesthetics of the natural environment. Culverts should only be constructed where a gentle grade must be maintained such as with a Barrier-free Trail or where there is permanently flowing water. In all other situations, a wash crossing (see [Section 8-3.304](#)) should be used. Rock or pipe culverts must match the downstream gradient and have a diameter of at least 12 inches to accommodate necessary cleaning. Improperly constructed culverts will clog with debris causing water to flow over and damage the trail tread. All rock used in the construction of culverts must be native.

1. Rock Culvert

The proper construction of rock culverts depends greatly on the proper selection and placement of rocks of sufficient size and shape. The bottom surface of the drainage must be armored with rocks to prevent erosion. Stone headwalls must be placed to armor the outside faces of the crossing. All rocks must be firmly placed similar to the construction of a retaining wall. Refer to Figure 8.3-8 below.

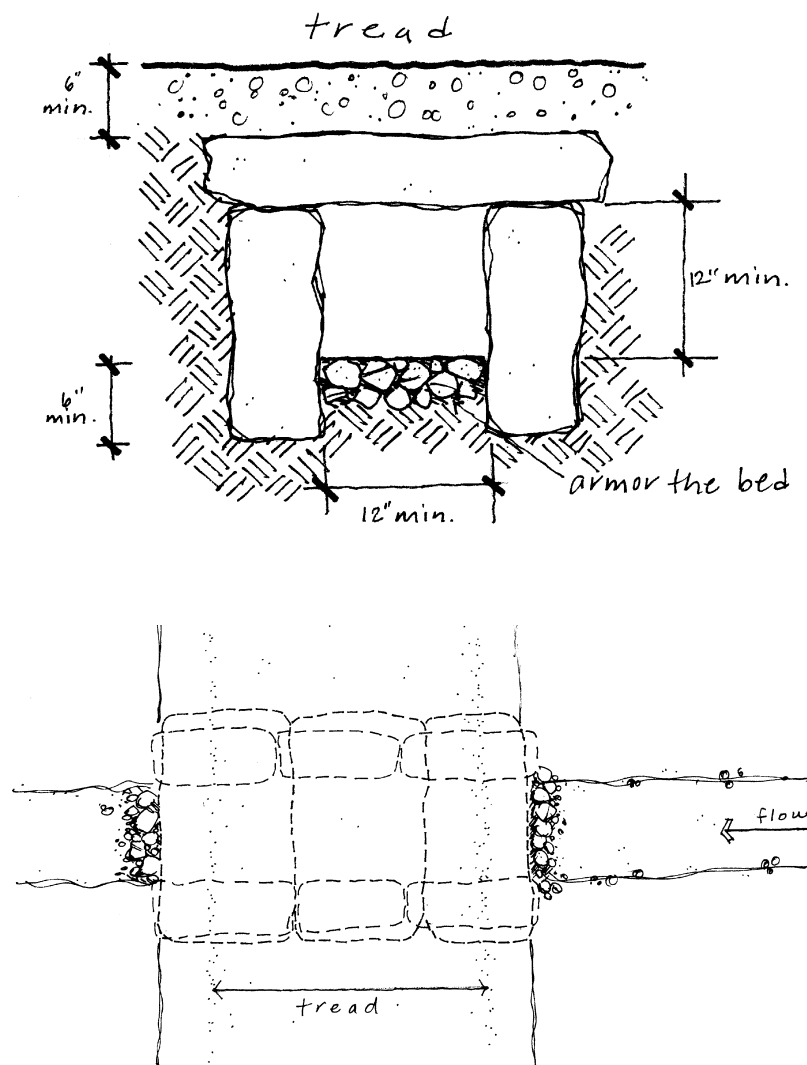


FIGURE 8.3-8. ROCK CULVERT

2. Pipe Culvert

Pipe diameter must be at least 12 inches. Embed the pipe in a stable foundation of gravel and soil, and backfill with compacted gravel and soil. Construct a headwall of firmly placed native stone to protect the outside faces of the tread crossing and cover the pipe so it cannot be viewed from the trail. The trail tread should be at least 6 inches higher than the top of the pipe. Refer to Figure 8.3-9 below.

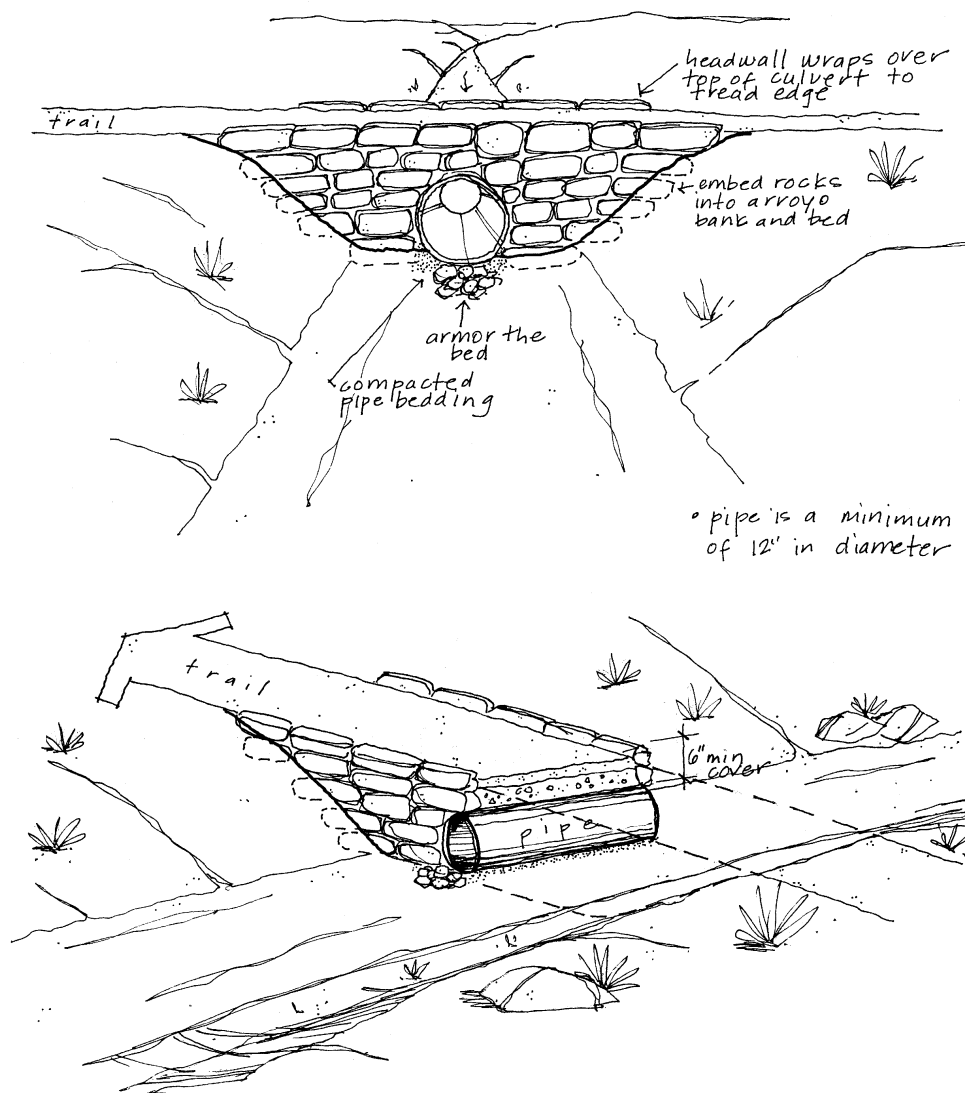


FIGURE 8.3-9. PIPE CULVERT

SPECIAL STRUCTURES

A. Retaining Walls

Retaining walls are stone structures used to stabilize trails on steep side slopes. A solid foundation is key to the strength and durability of a retaining wall. The foundation should be set in solid earth or rock, with the base sloped inward towards the hillside. Rock used in

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construction should be derived from the surrounding area. Ideal rocks are durable, weather resistant, and free of structural defects. Large rocks should be used in the foundation, smaller rocks in the middle tiers, and large rocks again for the upper tiers. Approximately 25 percent of the rocks used in the wall must be header stones.

A header stone is a rock placed with its longest dimension extending into the hillside, perpendicular to the face of the wall. All other rocks should be placed with their longest dimension parallel to the face of the wall. Thickness of the wall should be at least one-half its height, or 2 feet thick if the height is less than 5 feet. The outer face of the wall should slope inward towards the hillside at a rate of 3 inches per every 12 inches in height. Joints should be staggered at least 6 inches horizontally. Each rock should contact the rock below in at least three places. Shims must not be used because they are prone to shifting. If cement is used to provide additional stability, it must be colored to match the native rock. Backfill the wall with small stones and cover with soil until the proper tread surface is established. Refer to [Figure 8.3-10](#).

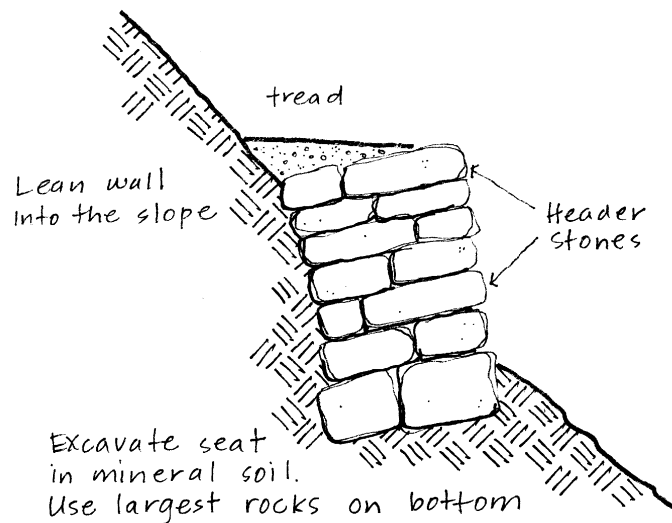
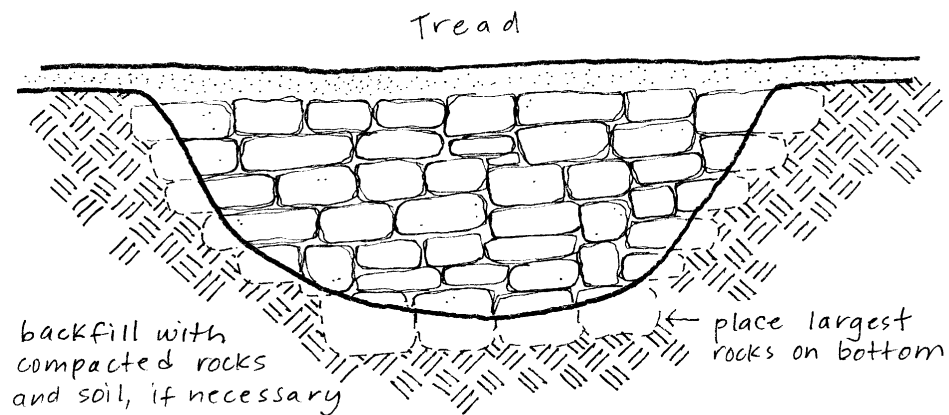


FIGURE 8.3-10. ROCK RETAINING WALLS

B. Rip-Rap

Unlike a retaining wall, riprap does not support the weight of the trail tread. Instead, riprap is used to stabilize steep slopes above and below the trail tread (backslope and fillslope, respectively). Begin by clearing a firm foundation at the downhill edge of the riprap. Set the largest rocks in the foundation. Place smaller rocks on the surface of the slope continuing up the slope to the desired location. Be sure that the riprap does not impede the flow of surface water off the trail tread. Riprap can also be used to protect drainage and leadoff ditches from heavy erosion, and to stabilize switchback turns. Riprap should be constructed of native rock. If cement is used to provide additional stability, it must be colored to match the native rock. Refer to [Figure 8.3-11](#).

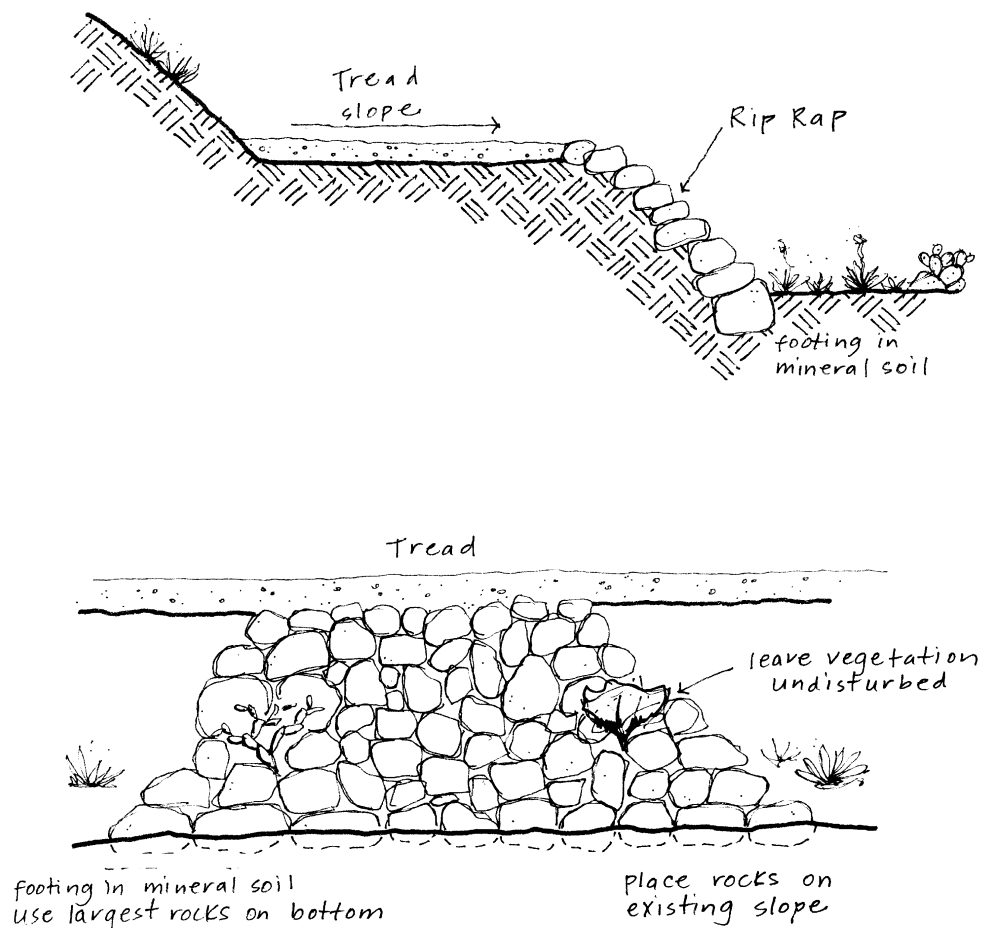


FIGURE 8.3-11. RIP RAP

C. Wash Crossings

When trails cross washes, the greatest concern is protecting the trail from flowing water. The trail segments approaching the crossing, and the location where the trail meets each edge of the wash must be stabilized with securely placed rocks. Trail segments approaching the wash should range from 8 to 15 percent for all trail classifications, and cross at a 90 degree angle to the wash to prevent water from leaving the primary channel

and flowing along the trail surface. The slopes adjacent to the trail may need to be stabilized with riprap. A row of large rocks should be embedded along the wash banks at the point of contact with the trail. Be sure that the flowing water will not undercut these rocks. Refer to Figure 8.3-12 below.

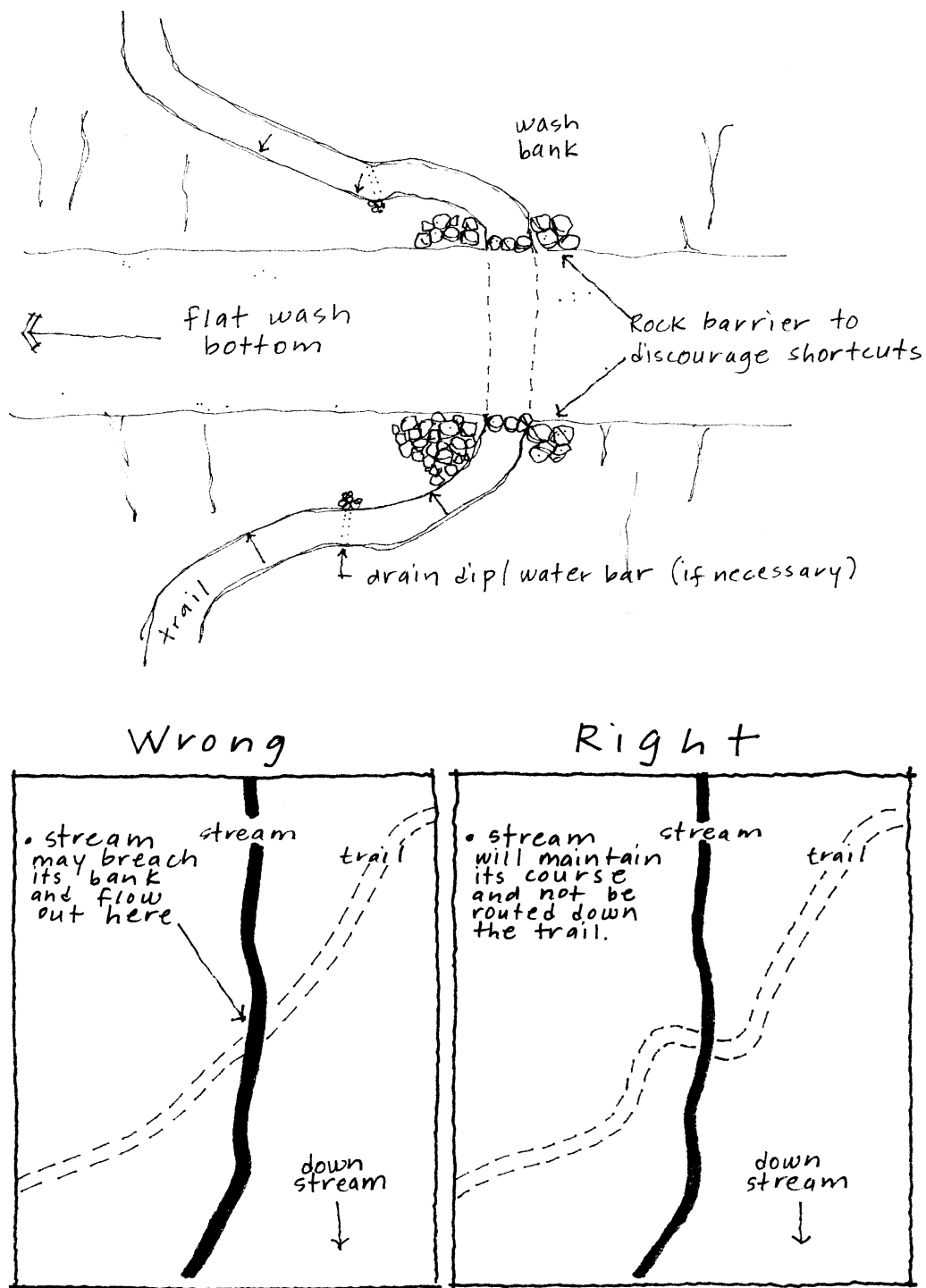


FIGURE 8.3-12. WASH CROSSING

D. Switchback and Climbing Turns

These two trail design elements are both used to change the direction of travel on a hillside and to gain elevation in a short distance. The difference between the two is that climbing turns maintain a consistent longitudinal slope through the turn, while switchbacks have a near level landing at the turning point. These structures can be very difficult to construct, therefore careful planning should be conducted to avoid using them. The city Trails Coordinator should be consulted in situations where switchbacks may be necessary.

Avoid “stacking” a set of many short switchbacks and/or climbing turns on a hillside. Longer trail segments between switchbacks and/or climbing turns are less visible and reduce shortcutting by trail users. Understanding the psychology of the trail user is important in the design of these structures. The layout must convince users that the established trail is the easiest, most convenient route to ascend the slope. If users feel it is not, they will create short cuts. Refer to Figure 8.3-13 below.

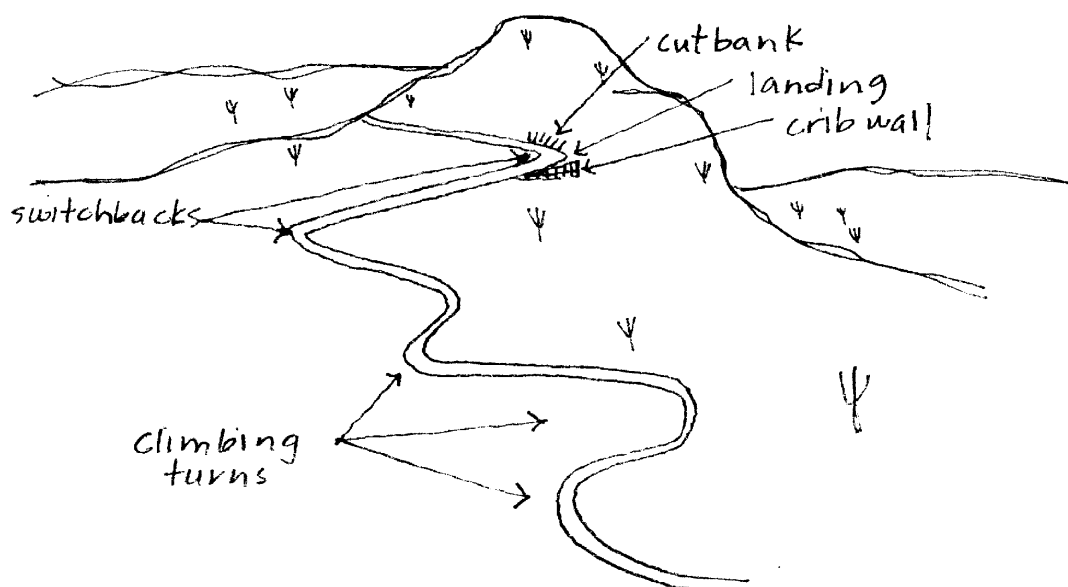


FIGURE 8.3-13. SWITCHBACK AND CLIMBING TURN CONCEPTS

1. Switchback Turn

Switchback turns are typically used on side slopes of 20 to 45 percent, but can be used on slopes up to 55 percent with the use of retaining walls. These structures are extremely difficult and expensive to construct. Trail routes should be planned carefully to avoid areas of steep, impassible terrain that would require switchbacks.

The key to a good switchback is proper placement on the terrain. Naturally occurring level areas or platforms are prime locations. Survey the hillside that the trail must ascend, locate the natural platforms, and then connect the trail to these points. Trail segments leading to and away from the switchback must maintain the maximum longitudinal slope permitted for that trail classification. Locating switchbacks in areas where there are obstructions such as rock outcroppings or trees that will prevent shortcutting is also desirable. Obstructions such as rocks, logs, or other debris may also be strategically placed to keep users from leaving the trail.

Switchbacks consist of two approaches, a landing or turn platform, a drain for the upper approach and platform, and guide structures. The upper approach and the upper half of the turn platform are excavated from the hillside. The lower approach and the lower half of the turn platform are constructed on fill. The construction of switchbacks on a full bench can be very labor intensive and expensive. The last 65 feet of each approach before reaching the turn platform should be as steep as the trail classification will allow. The last 10 feet of the approaches should be smoothly transitioned into the grade of the turn platform. A flat grade approaching the turn platform must be avoided because it will cause trail users to short cut the switchback. Refer to Figure 8.3-14 below.

As the upper approach descends toward the turn, a drain dip should be installed. Below this point, the tread and the upper half of the turn platform must be insloped towards a drain ditch. The ditch must be 1 foot deep and 1 foot wide and have a rock apron at the spill point.

The turn platform must not exceed a slope of 5 percent. The upper side is excavated from the hillside. The removed soil is then used to fill in the lower portion. Riprap or retaining walls may be required to provide stability to the backslope and fillslope. The turning radius must be no less than 8 feet to provide adequate turning area for equestrians and mountain bicyclists.

The lower portion of the turn platform and the lower approach should be outsloped. Riprap or a retaining wall may be needed along the inner portion of the switchback to maintain the backslope of the lower approach.

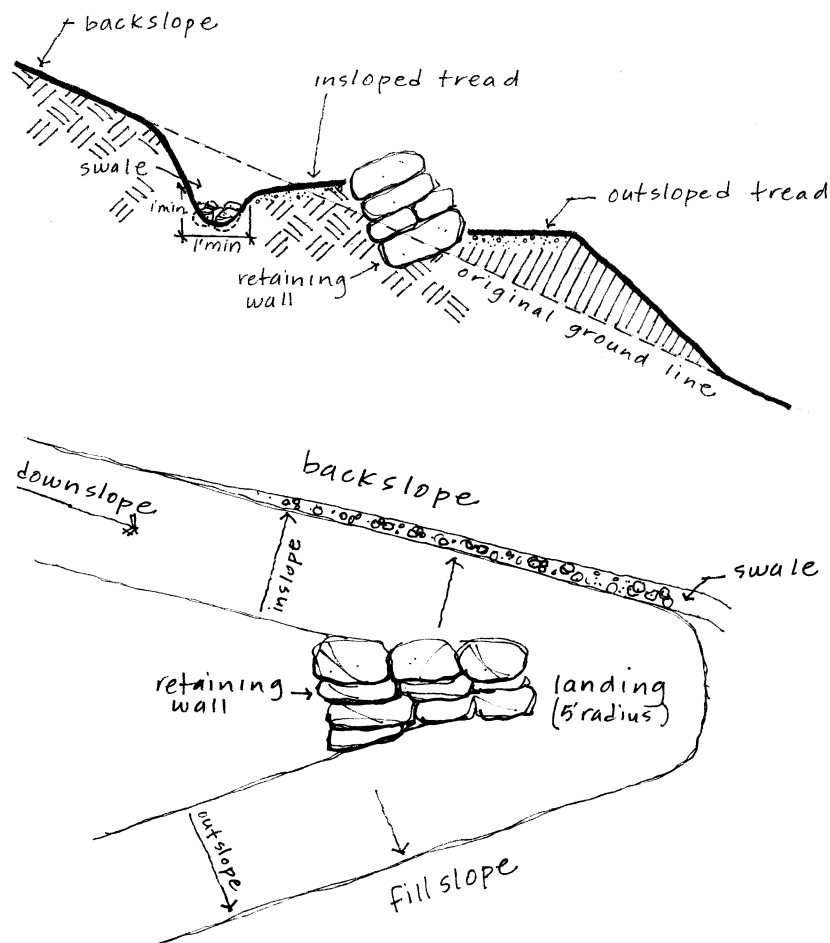


FIGURE 8.3-14. SWITCHBACK TURN

2. Climbing Turns

Climbing turns are similar to switchbacks because they are also used to reverse the direction of travel and gain elevation. Climbing turns differ however because they maintain a uniform longitudinal slope through the turn. There is no level turning platform. A climbing turn is built on the same slope as the hillside. Where the slope of the hillside turns, the climbing turn ascends at the same rate. Climbing turns must not be constructed on side slopes greater than 20 percent because they are prone to erosion. Climbing turns in appropriate terrain require very little work to construct. The approaches to the turn should be full bench construction. As the trail approaches the turn, the amount of excavation decreases. The turn itself requires no excavation other than the removal of the surface layer of leaf litter. Refer to Figure 8.3-15 below.

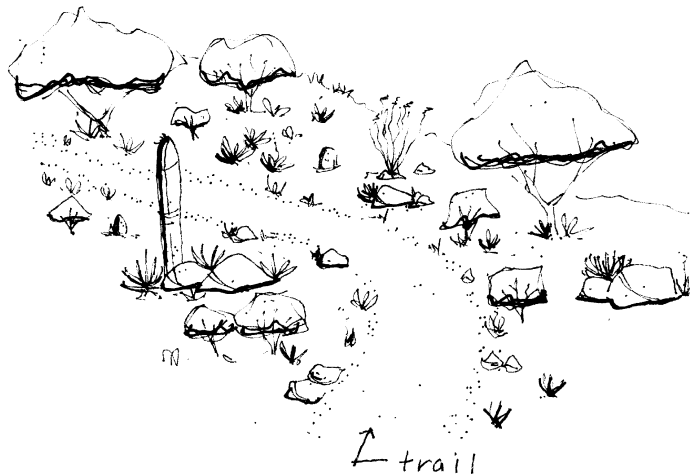


FIGURE 8.3-15. CLIMBING TURN

E. Steps

The use of steps should be avoided due to unsuitability for equestrians and mountain bicyclists, and excessive maintenance requirements. Steps should only be used on hiker-only trails when elevation must be gained rapidly over a short distance and there is no other option. Steps must not be used on trails intended for use by equestrians or mountain bicyclists. Steps should be constructed of rock collected from the surrounding area. Rocks should be rectangular in shape, large enough to maintain their position (50 to 100 pounds each), and wide enough to span the width of the trail. Choose a location that will prevent trail users from traveling around the steps. Construction should begin with the lower steps and continue up the slope. Each step must be placed in an excavated seat and backfilled with small rocks and soil to assure stability. Refer to Figure 8.3-16 below.

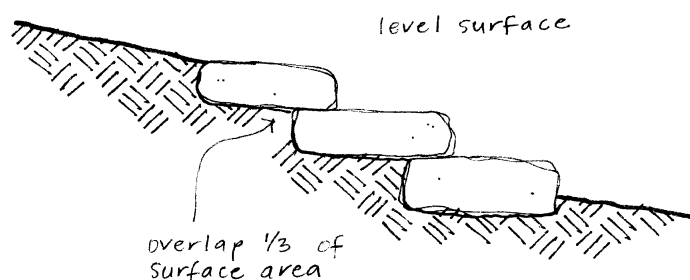


FIGURE 8.3-16. ROCK STEPS

F. Trail Safety Barriers

Trail Safety Barriers must comply with COS Standard Detail #2682, available online at www.scottsdaleaz.gov/design/DetailDrawings/.

1. Location

The location of safety barriers should not restrict sight distances for roadway traffic or trail users. Refer to Figure 3.1-8 for roadway sight distance requirements. Special attention to the design and construction of barriers is particularly important near intersections. Safety barriers must be installed between a trail and a roadway if the trail is located within an unsafe distance to the roadway, or if the trail shares an underpass or overpass with a roadway. Safety barriers must also be installed if the trail is elevated above an adjacent roadway and the side slope is greater than 6:1, or where trails are in close proximity to other steep drop-offs. All safety barriers must be at least 3 feet from the edge of the trail.

2. Design Criteria

Appropriate safety barriers include fences, railings, or suitably thick vegetation. Other types of materials may be suitable subsequent to approval of the city Trails Coordinator. The materials and character of the barrier must be compatible with adjacent development, landscaping, and topography. The minimum height should be 4 feet for structural barriers, and 5 feet for vegetation barriers.

3. Trail Access Gates

Trail Access Gates must comply with COS Standard Detail 2680-1 and 2680-2, available online at www.scottsdaleaz.gov/design/DetailDrawings/.

These gates are designed to restrict motorized access to trails except as permitted for maintenance and emergency purposes. The gate design must permit equestrian passage without requiring the rider to dismount. These gates should be located at trailheads, where trails cross major roads, and at other points where motorized vehicles are likely to attempt to access a trail.

8-3.305

ROAD CROSSINGS

A. Overpasses

An overpass is a structure spanning a roadway, canal, wash, etc. that functions exclusively as a crossing for a shared-use trail. There are many different varieties of overpasses that may be acceptable. The city Trails Planner must be involved in the planning and design process, and must approve all overpasses prior to construction. In general, minimum clearance is 10 feet both horizontally and vertically.

B. Bridges

A bridge is a structure spanning a roadway, canal, wash, or other obstacle that serves as a crossing for a roadway as well as a shared-use trail. The city Trails Planner must be involved in the planning and design process, and must approve all bridge crossings prior to construction. The minimum width of a trail crossing a bridge is 8 feet, and the minimum vertical clearance is 10 feet.

C. Underpasses

These structures, used to provide passage for trail users under roadways, are typically constructed of pre-cast concrete box culverts. Other varieties of culverts are acceptable provided they meet the required dimensions, and allow footing that is appropriate for all types of trail users. The width of a trail traveling through an underpass should not be less than 10 feet. Vertical clearance is an important concern, particularly for equestrian trail users. The minimum vertical clearance is 10 feet. Natural or vandal-resistant electric lighting should be installed for underpasses greater than 50 feet in length. Lighting shall

achieve an average of 2-foot candles. Sight distances approaching and exiting the underpass must be adequate, so as not to create a safety hazard. Underpass design should not allow for the accumulation of nuisance water on the trail. If water does not drain from the underpass by gravity flow, a pump system must be provided to remove the water. The surface of the underpass should be slip resistant, such as broom finished concrete.

D. At-Grade Crossings

An at-grade crossing occurs where a trail passes across the surface of a roadway. Safety of trail users is the primary concern when planning at-grade trail crossings. Ideal locations for such crossings are at roadway intersections with light amounts of traffic that have existing stop signs, traffic lights, or designated pedestrian crossings. Crossings should be on level grades where both trail users and motorists have long sight distances. Sight distances vary depending on the roadway classification. See Figure 5.3-26 for more details. Additional safety precautions include installing pedestrian activated traffic signals, signs warning motorists of the trail crossing, and signs warning the trail users of the road crossing.

TRAIL ACCESS FACILITIES

The design criteria for trail access facilities addressed in this manual are conceptual. The planning, design, and construction of such facilities will be conducted on a case-by-case basis and will require various levels of city review and approval beyond the scope of this manual. Potential trailhead amenities include, but are not limited to, pull-through horse trailer parking spaces; regular vehicle parking spaces; potable drinking water; water troughs for horses; hitching posts or corrals; year-round natural shade areas; bike racks; informational, interpretive and directional signage; entrance gates; restrooms; shade ramadas; and picnic tables. Refer to Figure 8.3-17 below.

8-3.306

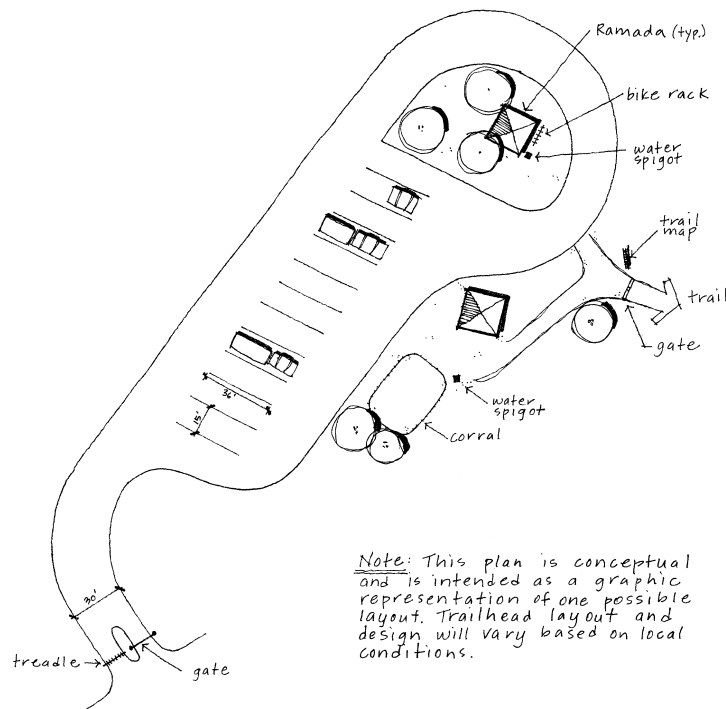


FIGURE 8.3-17. TRAIL ACCESS FACILITY CONCEPT

8-3.400

TRAIL SIGNS & MARKERS

8-3.401

SIGN LOCATIONS

The proper location of signage is important in maintaining the safety of trail users, preserving the natural environment, and promoting the presence of the trail. The number and location of signs should be carefully considered, as a lack of signage or poorly located signs can create hazardous situations for trail users. An overabundance of signs can also detract from the aesthetics of the trail and decrease the quality of the trail users' experience.

Trail signs are typically located at trail intersections, locations where trails cross roadways, and any other areas where it may be difficult to follow the route of the trail. Trail signs should be placed 1.5 feet to 3 feet from the edge of the trail.

8-3.402

SIGN SPECIFICATIONS

This standard applies specifically to trails classified as Urban or Rural. Additional standards may be developed for Backcountry Primary and Secondary trails pending review and approval from the city's Preserve Division. Refer to Figure 8.3-18 below.

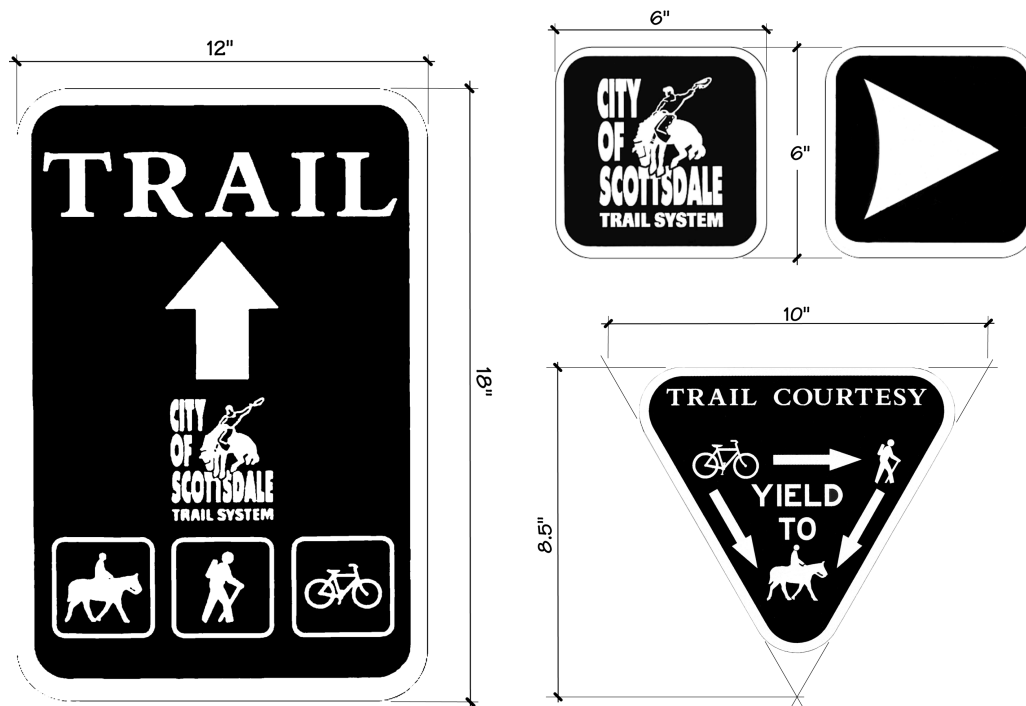


FIGURE 8.3-18. TRAIL SIGNS

A. Sign Specifications

1. Blanks

Sign blanks must be 0.080-gauge aluminum. Thicker, 0.125-gauge aluminum should be used for signs prone to vandalism, such as the "no motorized vehicle" signs. Blanks must be covered with reflective sheeting of street transportation quality vinyl. There must be two, pre-drilled, 3/8-inch holes. The holes must be centered horizontally with the center of each

hole being ½ inch from the top and bottom edges. Corners must be rounded with a 1-inch to 1½ -inch radius, depending on the size of the sign.

2. Lettering

- Font must be Garamond (or similar style).
- Point size should be relative to the size of the sign.

3. Colors

Background must be dark brown with reflective white lettering and symbols. There must be a ¼-inch to ½-inch, white reflective border. For regulatory signs such as the “no motorized vehicle” sign, there shall be a white reflective background with red lettering.

4. Sign Mounting Hardware

- 3/8-inch, vandal resistant, steel drive rivets.

B. Post Specification

Posts shall be constructed of 1 ¾” x 1 ¾”, 12-gauge, square steel tubing with 7/16-inch, pre-punched knockouts on 1-inch centers. Post lengths must be 6 feet. All steel posts shall be powder coated with color to match natural rust as closely as possible. The trails planner must approve color samples prior to fabrication.

C. Sleeve and Anchor Specifications

Sleeves and anchors shall be used in locations where it is possible for a vehicle to come into contact with the signpost, such as adjacent to a street. The use of the sleeve and anchor promote easy breaking-away of the sign post in the event of a collision, and increase the ease at which the sign can be replaced.

1. Anchors

Anchors shall be 2” x 2” x 30”, 12-gauge galvanized square tubing with 7/16-inch, pre-punched knockouts on 1-inch centers.

2. Sleeves

- Sleeves shall be 2 ¼” x 2 ¼” x 12”, 12-gauge, galvanized square tubing, with
- 7/16-inch, pre-punched knockouts on 1-inch centers.

3. Anchor Assembly Hardware

- 3/8-inch, vandal resistant, steel drive rivets.

4. Telescoping Properties

The finish post, anchor, and sleeve must be straight with a smooth uniform finish to allow each component to telescope with each consecutive larger or smaller piece.

INSTALLATION

Signposts adjacent to streets are to be installed according to COS Standard Detail 2131, available online at www.scottsdaleaz.gov/design/DetailDrawings/, and the Manual of Uniform Traffic Control Devices.

In non-roadside locations the signpost can be mounted directly into concrete. The finished height of the post should be 5.5 feet.

Various combinations of signs can be mounted on a single post to address the management needs of the particular area.

8-3.403

All signs are to be mounted to the posts with 3/8-inch, vandal resistant, steel drive rivets. Refer to Figure [8.3-19](#).

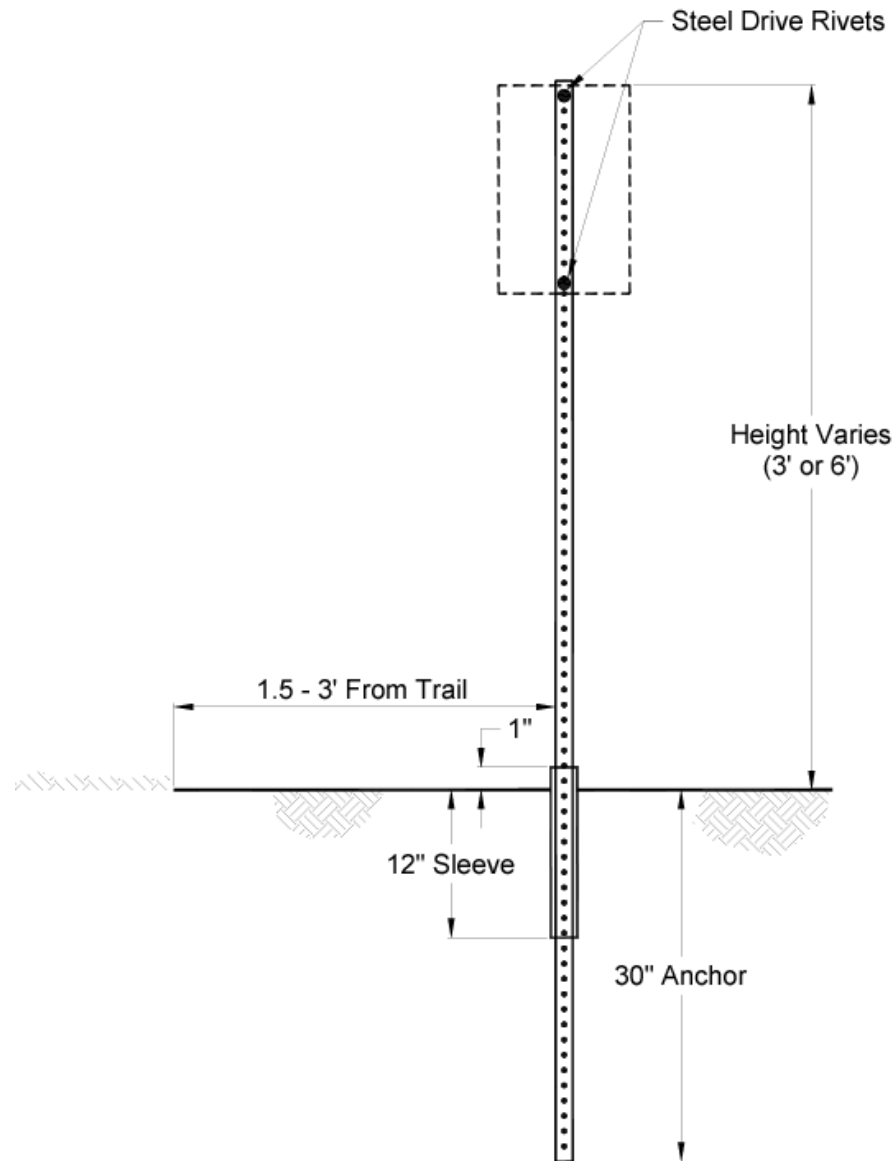


FIGURE 8.3-19. TRAIL SIGN INSTALLATION

8-3.404

DEVELOPER-PROVIDED SIGN STANDARD

Developers may provide their own signage consistent in color and theme with the surrounding development. At a minimum, these signs must accommodate the triangular “Trail Courtesy” graphic, the “City of Scottsdale Trail System” logo, and the standard hiker, equestrian, and mountain bicycle icons. These required signs may be installed on the same post as developer-provided signs, or the graphics may be incorporated directly into the developer-provided sign. The graphics for the signs may be obtained by contacting the city Trails Planner.

TRAIL MAINTENANCE

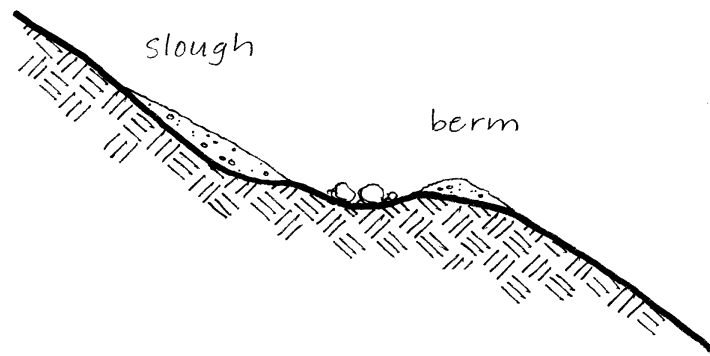
8-3.500

A. Slough and Berm Removal

Slough (pronounced “sluff”) is material that has moved downhill from the backslope and been deposited along the uphill edge of the tread. This process causes trail users to travel along the outside edge of the trail. The tread eventually narrows and moves downhill from its original location resulting in an unsafe situation. The slough must be removed to re-establish the proper backslope. The excess material may be used to fill holes in the trail tread and re-establish the outslope, or to build up the downhill side of waterbars.

Berm is soil that has built up on the downhill edge of the trail tread. Berm prevents water from flowing off the side of the trail and allows water to channel down the trail causing erosion. A berm may also cause nuisance water to pool on the trail surface resulting in soil saturation. Saturated soil is damaged easily and forces trail users to detour around the area causing the trail to widen. Berms should never be constructed intentionally, and should be eliminated whenever present. Refer to Figure 8.3-20 below.

Before Reconstruction



After Reconstruction

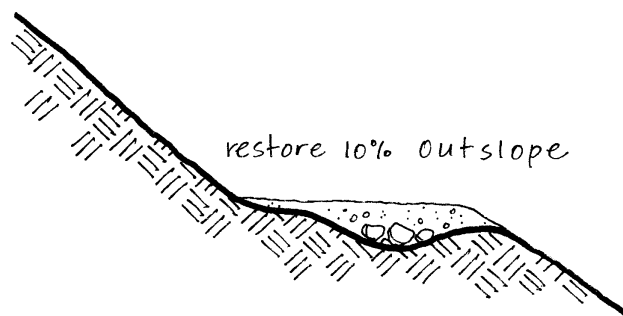


FIGURE 8.3-20. SLOUGH AND BERM REMOVAL

B. Vegetation Clearance Maintenance

All plants encroaching on the vegetation clearance limits for the particular trail classification must be cut back. Branches should be cut close to the main stem without cutting into the branch collar. Plants being removed must be cut flush with the ground and stumps must be removed to prevent safety hazards. All plants growing within the trail tread must be grubbed-out. Trails within landscaped areas may be sprayed with herbicide. All removed plant material must be scattered in a location not visible from the trail.

C. Tread Maintenance

In addition to slough and berm removal, the remaining trail tread should be restored to its original design condition. All loose rocks, rock points, stumps, and roots protruding from the trail surface should be removed. All holes should be filled to create a smooth, obstacle-free trail tread. Maintaining a proper outslope is critical to the long-term condition of the trail.

D. Drainage Maintenance

Special attention should be directed to the maintenance of drainage structures. These structures are extremely important in protecting the trail from erosion. If they are not maintained properly, the trail will be prone to erosion, and may become unsafe for public use and require extensive amounts of labor to repair. All repairs to drainage structures must restore them to their original standard construction specifications.

E. Special Structure Maintenance

Structures such as waterbars, culverts, switchbacks, retaining walls, wash crossings, overpasses, bridges, etc. are rather expensive and labor intensive to construct. Proper maintenance will prolong the life of the structures and help prevent safety hazards. Structures should be inspected annually and maintenance performed as needed. All repairs to special structures must restore them to their original standard construction specifications.

F. Sign Maintenance

Sign maintenance includes replacing missing or damaged signs and assuring the accuracy of the information on the signs, as conditions may change over time. All signs that are damaged, weathered, or for any other reason do not serve their intended purpose should be repaired or replaced according to the sign standards described in this manual



Landscaped Medians – Appendix 8-1A

Recommended Plants for Downtown

OLD TOWN									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
GROUNDCOVERS, VINES, & OTHER									
<i>Agave murpheyi</i>	✓	Murphy's Agave		●	●	●			
<i>Aloe</i>	✓	Blue Elf		●	●	●	●		
<i>Aloe mawei</i>	✓	Dawe's Aloe		●	●	●	●		
<i>Antigonon leptopus</i>	✓	Coral Vine/Queen's Wreath				●	●		
<i>Baileya multiradiata</i>	✓	Desert Marigold	●	●	●			●	
<i>Cereus hildemannianus</i>	✓	Night Blooming Cereus	●	●	●				
<i>Dyssodia pentachaeta</i>		Golden Fleece		●	●	●	●	●	
<i>Hymenoxys acaulis</i>		Anjelita Daisy		●	●	●	●	●	●
<i>Lantana montevidensis</i>	✓	Trailing Lantana	●	●	●	●	●	●	
<i>Podranea ricasoliana</i>	✓	Pink Trumpet Vine				●	●		
<i>Stenocereus thurberi</i>	✓	Organ Pipe Cactus	●	●	●				
<i>Yucca aloifolia</i>	✓	Spanish Bayonet			●	●	●		
<i>Yucca baccata</i>	✓	Banana Yucca	●	●				●	
SHRUBS									
<i>Encelia farinosa</i>	✓	Brittlebush	●	●	●			●	
<i>Guaiacum coulteri</i>	✓	Guayacan	●	●	●	●		●	
<i>Lantana camara</i>	✓	Lantana, Shrub Verbena	●	●	●	●	●	●	
<i>Leucophyllum frutescens</i>	✓	Texas Sage	●	●	●				
<i>Maytenus phyllanthoides</i>	✓	Mangle Dulce	●	●	●			●	
<i>Muhlenbergia rigens</i>		Deer Grass		●	●			●	
<i>Salvia clevelandii</i>	✓	Cleveland Sage	●	●	●			●	
<i>Simmondsia chinensis</i>	✓	Jojoba	●	●	●	●		●	
<i>Tecoma stans</i>	✓	Yellow Bells		●	●	●	●		



Landscaped Medians – Appendix 8-1A

Recommended Plants for Downtown

OLD TOWN (continued)									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
SMALL TREES									
<i>Acacia willardiana</i>	✓	Palo Blanco			●	●	●		
<i>Bauhinia blakeana</i>		Orchid Tree				●	●		
<i>Caesalpinia mexicana</i>	✓	Mexican Bird Of Paradise		●	●	●	●		
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		●	●	●	●		
<i>Chamaerops humilis</i>	✓	Med. Fan Palm				●	●		
<i>Eucalyptus erythrocorys</i>	✓	Red Cap Gum		●	●	●			
<i>Lysiloma thornberi</i>	✓	Fern Of The Desert		●	●	●		●	
<i>Sophora secundiflora</i>	✓	Texas Mountain Laurel		●	●	●	●		
MEDIUM TREES									
<i>Acacia smalli</i>	✓	Sweet Acacia	●	●		●		●	
<i>Acacia stenophylla</i>	✓	Shoestring Acacia		●	●				
<i>Cercidium parkinsonia Hybrid</i>	✓	Desert Museum		●				●	
<i>Chorisa speciosa</i>	✓	Floss Silk Tree				●	●		
<i>Eucalyptus spatulata</i>	✓	Narrow-Leaf Gimlet	●	●	●	●			
<i>Eucalyptus torquata</i>	✓	Coral Gum			●	●	●		
<i>Geijera parviflora</i>	✓	Australian Willow			●	●	●		
LARGE TREES									
<i>Jacaranda mimosifolia</i>	✓	Jacaranda			●	●	●		
<i>Ulmus parvifolia</i>	✓	Evergreen Elm	●	●	●	●		●	
<i>Washingtonia robusta</i>	✓	Mex. Fan Palm	●						

* Listed on Arizona Department of Water Resources lists of native, drought-tolerant and low water-use plants, trees and shrubs.



Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

MAIN STREET									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
GROUNDCOVERS, VINES, & OTHER									
<i>Agave murpheyi</i>	✓	Murphy's Agave		●	●	●			
<i>Agave weberii</i>	✓	Weber's Agave	●	●					
<i>Aloe</i>	✓	Blue Elf		●	●	●	●		
<i>Aloe dawei</i>	✓	Dawe's Aloe		●	●	●	●		
<i>Antigonon leptopus</i>	✓	Coral Vine/Queen's Wreath				●	●		
<i>Dasyllirion wheeleri</i>	✓	Desert Spoon	●	●					
<i>Gazania hybrids</i>	✓	Harlequin Hybrids		●	●	●			
<i>Lantana montevidensis</i>	✓	Trailing Lantana	●	●	●	●	●	●	
<i>Opuntia basilaris</i>	✓	Beaver Tail Prickly Pear	●	●	●				
<i>Opuntia santa-rita</i>	✓	Purple Prickly Pear	●	●	●				
<i>Podranea ricasoliana</i>	✓	Pink Trumpet Vine				●	●		
<i>Yucca recurvata</i>	✓				●	●	●		
SHRUBS									
<i>Asclepias subulata</i>	✓	Desert Milkweed		●	●	●			
<i>Caesalpinia mexicana</i>	✓	Mexican Bird of Paradise	●	●	●				
<i>Dalea frutescens</i>	✓	Black Dalea	●	●		●			
<i>Dalea pulchra</i>	✓	Bush Dalea	●	●				●	
<i>Encelia farinosa</i>	✓	Brittlebush	●	●	●			●	
<i>Guaiacum coulteri</i>	✓	Guayacan	●	●	●	●		●	
<i>Justica candicans</i>	✓	Red Justica	●	●	●	●	●	●	
<i>Lantana</i>	✓	Red/Pink Forms		●	●				
<i>Maytenus phyllanthoides</i>	✓	Mangle Dulce	●	●	●			●	
<i>Ruellia brittoniana</i>	✓	Ruellia 'Katie' Pink/White Forms		●	●	●			



Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

MAIN STREET (continued)									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
SHRUBS (continued)									
<i>Salvia clevelandii</i>	✓	Cleveland Sage	●	●	●			●	
<i>Simmondsia chinensis</i>	✓	Jojoba	●	●	●	●		●	
<i>Tecoma stans</i>	✓	Yellow Bells		●	●	●	●		
SMALL TREES									
<i>Caesalpinia mexicana</i>	✓	Mexican Bird of Paradise		●	●	●	●		
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		●	●	●	●		
<i>Chamaerops humilis</i>	✓	Med. Fan Palm				●	●		
<i>Eucalyptus erythrocorys</i>	✓	Red Cap Gum		●	●	●			
<i>Lysiloma thornberi</i>	✓	Fern of the Desert		●	●	●		●	
<i>Sophora secundiflora</i>	✓	Texas Mountain Laurel		●	●	●	●		
MEDIUM TREES									
<i>Acacia smallii</i>	✓	Sweet Acacia	●	●		●		●	
<i>Cercidium Parkinsonia Hybrid</i>	✓	Desert Museum		●				●	
<i>Chorisa speciosa</i>	✓	Floss Silk Tree				●	●		
<i>Eucalyptus spatulata</i>	✓	Narrow Leaf Gimlet	●	●	●	●			
<i>Eucalyptus torquata</i>	✓	Coral Gum			●	●	●		
<i>Geijera parviflora</i>	✓	Australian Willow			●	●	●		
LARGE TREES									
<i>Jacaranda mimosifolia</i>		Jacaranda			●	●	●		
<i>Ulmus parvifolia</i>	✓	Evergreen Elm	●	●	●	●		●	
<i>Washingtonia robusta</i>	✓	Mexican Fan Palm	●						

* Listed on Arizona Department of Water Resources lists of native, drought-tolerant and low water-use plants, trees and shrubs.



Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

FIFTH AVENUE									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
GROUNDCOVERS, VINES, & OTHER									
<i>Aloe ferox</i>	✓	Cape Aloe		●	●	●	●		
<i>Aloe marlothii</i>	✓	Aloe Berger		●	●	●	●		
<i>Antigonon leptopus</i>	✓	Coral Vine/Queen's Wreath				●	●		
<i>Aquilegia chrysantha</i>		Golden Columbine		●	●	●			
<i>Dasyliirion wheeleri</i>	✓	Desert Spoon	●	●					
<i>Gazania hybrids</i>	✓	Harlequin Hybrids		●	●	●			
<i>Lantana montevidensis</i>	✓	Trailing Lantana	●	●	●	●	●	●	
<i>Podranea ricasoliana</i>	✓	Pink Trumpet Vine				●	●		
<i>Wedelia trilobata</i>	✓	Yellow Dot		●	●				
<i>Yucca elephantipes</i>		Spineless Yucca	●	●	●			●	
<i>Yucca recurvata</i>	✓				●	●	●		
SHRUBS									
<i>Bougainvillea</i>	✓	Bush Types		●	●	●	●		
<i>Cordia parvifloia</i>	✓	Little Leaf Cordia		●	●		●		
<i>Dalea capitata</i>	✓	Golden Dalea		●	●	●	●		●
<i>Guaiacum coulteri</i>	✓	Guayacan	●	●	●	●		●	
<i>Lantana</i>	✓	Red/Pink Forms		●	●				
<i>Maytenus phyllanthoides</i>	✓	Mangle Dulce	●	●	●			●	
<i>Mulhenbergia capillaris</i>	✓	Pink Mulhy/Gulf Mulhy	●	●	●	●		●	
<i>Muhlenbergia emersleyi</i>	✓	Bull Grass	●	●	●	●		●	
<i>Muhlenbergia rigens</i>		Deer Grass		●	●			●	
<i>Salvia clevelandii</i>	✓	Cleveland Sage	●	●	●			●	
<i>Senna phyllodemia</i>	✓	Silver-Leaf Cassia		●	●	●			



Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

FIFTH AVENUE (continued)									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
SHRUBS (continued)									
<i>Simmondsia chinensis</i>	✓	JOJOBA	●	●	●	●		●	
<i>Tecoma stans</i>	✓	YELLOW BELLS		●	●	●	●		
SMALL TREES									
<i>Acacia willardiana</i>	✓	Palo Blanco			●	●	●		
<i>Bauhinia blakeana</i>		Orchid Tree				●	●		
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		●	●	●	●		
<i>Chamaerops humilis</i>	✓	Med. Fan Palm				●	●		
<i>Lysiloma thornberi</i>	✓	Fern Of The Desert		●	●	●		●	
<i>Sophora secundiflora</i>	✓	Texas Mountain Laurel		●	●	●	●		
MEDIUM TREES									
<i>Cercidium Parkinsonia Hybrid</i>	✓	Desert Museum		●				●	
<i>Chorisa speciosa</i>	✓	Floss Silk Tree				●	●		
<i>Eucalyptus spatulata</i>	✓	Narrow-Leaf Gimlet	●	●	●	●			
<i>Eucalyptus torquata</i>	✓	Coral Gum			●	●	●		
<i>Ficus nitida</i>		Laurel Fig				●	●		
<i>Geijera parviflora</i>	✓	Australian Willow			●	●	●		
LARGE TREES									
<i>Dalbergia sisso</i>	✓	Sissoo Tree	●	●	●			●	
<i>Eucalyotus citriodora</i>	✓	Lemon Scented Gum	●	●	●	●		●	
<i>Eucalyptus salmonoploia</i>	✓	Salmon Gum	●	●	●				
<i>Jacaranda mimosifolia</i>		Jacaranda			●	●	●		
<i>Ulmus parvifolia</i>	✓	Evergreen Elm	●	●	●	●		●	
<i>Washingtonia robusta</i>	✓	Mex. Fan Palm	●						

* Listed on Arizona Department of Water Resources lists of native, drought-tolerant and low water-use plants, trees and shrubs.



Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

MARSHALL WAY									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
GROUNDCOVERS, VINES, & OTHER									
<i>Aloe ferox</i>	✓	Cape Aloe		●	●	●	●		
<i>Aloe marlothii</i>	✓	A. Berger		●	●	●	●		
<i>Antigonon leptopus</i>	✓	Coral Vine/Queen's Wreath				●	●		
<i>Dasyllirion wheeleri</i>	✓	Desert Spoon	●	●					
<i>Gazania hybrids</i>	✓	Harlequin Hybrids		●	●	●			
<i>Lantana montevidensis</i>	✓	Trailing Lantana	●	●	●	●	●	●	
<i>Podranea ricasoliana</i>	✓	Pink Trumpet Vine				●	●		
<i>Yucca recurvata</i>	✓				●	●	●		
SHRUBS									
<i>Bougainvillea</i>	✓	Bush Types		●	●	●	●		
<i>Convolvulus cneorum</i>	✓	Bush Morning Glory	●	●	●	●	●	●	
<i>Eremophila maculata</i>	✓	Emu Bush-Valentine		●	●	●			
<i>Guaiacum coulteri</i>	✓	Guayacan	●	●	●	●		●	
<i>Justica sonorae</i>	✓	Sonoran Honeysuckle		●	●	●			
<i>Maytenus phyllanthoides</i>	✓	Mangle Dulce	●	●	●			●	
<i>Poliomintha maderensis</i>		Mexican Oregano, Lavender Spice		●	●				
<i>Salvia clevelandii</i>	✓	Cleveland Sage	●	●	●			●	
<i>Simmondsia chinensis</i>	✓	Jojoba	●	●	●	●		●	
<i>Tecoma stans</i>	✓	Yellow Bells		●	●	●	●		



Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

MARSHALL WAY (continued)									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
SMALL TREES									
<i>Acacia willardiana</i>	✓	Palo Blanco			●	●	●		
<i>Bauhinia blakeana</i>		Orchid Tree				●	●		
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		●	●	●	●		
<i>Chamaerops humilis</i>	✓	Med. Fan Palm				●	●		
<i>Lysiloma thornberi</i>	✓	Fern Of The Desert		●	●	●		●	
<i>Sophora secundiflora</i>	✓	Texas Mountain Laurel		●	●	●	●		
MEDIUM TREES									
<i>Cercidium Parkinsonia Hybrid</i>	✓	Desert Museum		●				●	
<i>Chorisa speciosa</i>	✓	Floss Silk Tree				●	●		
<i>Eucalyptus spatulata</i>	✓	Narrow-Leaf Gimlet	●	●	●	●			
<i>Eucalyptus torquata</i>	✓	Coral Gum			●	●	●		
<i>Ficus nitida</i>		Laurel Fig				●	●		
<i>Geijera parviflora</i>	✓	Australian Willow			●	●	●		
LARGE TREES									
<i>Dalbergia sisso</i>	✓	Sissoo Tree	●	●	●			●	
<i>Eucalyotus citriodora</i>	✓	Lemon Scented Gum	●	●	●	●		●	
<i>Eucalyptus salmonoploia</i>	✓	Salmon Gum	●	●	●				
<i>Jacaranda mimosifolia</i>		Jacaranda			●	●	●		
<i>Ulmus parvifolia</i>	✓	Evergreen Elm	●	●	●	●		●	
<i>Washingtonia robusta</i>	✓	Mex. Fan Palm	●						

* Listed on Arizona Department of Water Resources lists of native, drought-tolerant and low water-use plants, trees and shrubs.



Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

DRINKWATER BLVD.									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
GROUNDCOVERS, VINES, & OTHER									
<i>Dasyllirion longissima</i>	✓	Mexican Grass Tree	●	●					
<i>Hesperaloe parviflora</i>	✓	Red Yucca	●	●	●	●		●	
<i>Lotus berthelotii</i>	✓	Parrot's Beak	●	●	●	●			
<i>Nolina matapensis</i>	✓	Tree Bear Grass	●	●					
<i>Oenothera berlandieri</i>	✓	Mexican Evening Primrose	●	●	●	●	●	●	
<i>Penstemon spp.</i>	✓	Bearded Tongue	●	●	●			●	
<i>Verbena rigida</i>	✓	Sandpaper Rigida	●	●	●				
<i>Yucca rupicola</i>	✓	Twisted Yucca	●	●	●			●	
SHRUBS									
<i>Bougainvillea</i>	✓	Bush Types		●	●	●	●		
<i>Caesalpinia pulcherimma</i>	✓	Red Bird Of Paradise	●	●	●	●		●	
<i>Cordia parviflora</i>	✓	Little-Leaf Cordia		●	●		●		
<i>Dalea pulchra</i>	✓	Bush Dalea	●	●				●	
<i>Lantana camara</i>	✓	Lantana, Shrub Verbena	●	●	●	●	●	●	
<i>Leucophyllum langmaniae</i>	✓	Cinnamon Sage	●	●	●			●	
<i>Ruellia peninsularis</i>	✓	Baja Ruellia	●	●	●	●		●	
<i>Salvia leucantha</i>	✓	Purple Mexican Bush Sage			●	●	●		
<i>Tecoma</i>	✓	Organ Jubilee		●	●	●	●		



Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

DRINKWATER BLVD. (continued)									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
SMALL TREES (none)									
MEDIUM TREES									
<i>Prosopis alba</i>	✓	Argentine Mesquite	●	●	●			●	
<i>Prosopis chilensis</i>	✓	Chilean Mesquite	●	●	●			●	
<i>Prosopis glandulosa</i>	✓	Honey Mesquite	●	●	●			●	
LARGE TREES									
<i>Eucalyptus citriodora</i>	✓	Lemon Scented Gum	●	●	●	●		●	
<i>Eucalyptus papuana</i>	✓	Ghost Gum	●	●	●			●	
<i>Eucalyptus salmophloia</i>	✓	Salmon Gum	●	●	●				
<i>Phoenix dactylifera</i>	✓	Date Palm	●						
<i>Washingtonia filifera</i>	✓	Calif. Fan Palm	●						

* Listed on Arizona Department of Water Resources lists of native, drought-tolerant and low water-use plants, trees and shrubs.



Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

GOLDWATER BLVD.									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
GROUNDCOVERS, VINES, & OTHER									
<i>Baileya multiradiata</i>	✓	Desert Marigold	●	●	●			●	
<i>Dasyllirion acrotriche</i>	✓	Green Desert Spoon	●	●					
<i>Hesperaloe parviflora</i>	✓	Red Yucca	●	●	●	●		●	
<i>Yucca aloifolia</i>	✓	Spanish Bayonet			●	●	●		
<i>Yucca baccata</i>	✓	Banana Yucca	●	●				●	
SHRUBS									
<i>Caesalpinia pulcherrima</i>	✓	Red Bird Of Paradise	●	●	●	●		●	
<i>Calliandra californica</i>	✓	Baja Fairy Duster	●	●	●	●		●	
<i>Lantana camara</i>	✓	Lantana, Shrub Verbena	●	●	●	●	●	●	
<i>Leucophyllum langmaniae</i>	✓	Cinnamon Sage	●	●	●			●	
<i>Ruellia peninsularis</i>	✓	Baja Ruellia	●	●	●	●		●	
<i>Salvia leucantha</i>	✓	Purple Mexican Bush Sage			●	●	●		
<i>Tecoma</i>	✓	Organ Jubilee		●	●	●	●		
SMALL TREES (none)									
MEDIUM TREES									
<i>Prosopis alba</i>	✓	Argentine Mesquite	●	●	●			●	
<i>Prosopis chilensis</i>	✓	Chilean Mesquite	●	●	●			●	
<i>Prosopis glandulosa</i>	✓	Honey Mesquite	●	●	●			●	
LARGE TREES									
<i>Eucalyptus microtheca</i>	✓	Coolibah	●	●				●	
<i>Eucalyptus papuana</i>	✓	Ghost Gum	●	●	●			●	
<i>Phoenix dactylifera</i>	✓	Date Palm	●						
<i>Washingtonia filifera</i>	✓	Calif. Fan Palm	●						

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Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

CAMELBACK ROAD									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
GROUNDCOVERS, VINES, & OTHER									
<i>Dalea greggii</i>	✓	Trailing Indigo Bush	●	●	●			●	
<i>Dasyllirion longissima</i>	✓	Mexican Grass Tree	●	●					
<i>Hesperaloe parviflora</i>	✓	Red Yucca	●	●	●	●		●	
<i>Lantana montevidensis</i>	✓	Trailing Lantana	●	●	●	●	●	●	
<i>Lotus berthelotii</i>	✓	Parrot's Beak	●	●	●	●			
<i>Nolina matapensis</i>	✓	Tree Bear Grass	●	●					
<i>Oenothera berlandieri</i>	✓	Mexican Evening Primrose	●	●	●	●	●	●	
<i>Penstemon spp.</i>	✓	Bearded Tongue	●	●	●			●	
<i>Verbena rigida</i>	✓	Sandpaper Rigida	●	●	●				
<i>Yucca rupicola</i>	✓	Twisted Yucca	●	●	●			●	
SHRUBS									
<i>Calliandra californica</i>	✓	Baja Fairy Duster	●	●	●	●		●	
<i>Dalea pulchra</i>	✓	Bush Dalea	●	●				●	
<i>Leucophyllum candidum</i>	✓	Violet Silverleaf	●	●	●				
<i>Tecoma stans</i>	✓	Yellow Bells		●	●	●	●		
SMALL TREES									
<i>Bauhinia lunarioides</i> or <i>Bauhinia congesta</i>	✓	Chihuahuan Orchid Shrub		●	●	●	●		
<i>Eucalyptus erythrocorys</i>	✓	Red Cap Gum		●	●	●			



Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

CAMELBACK ROAD (continued)									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
MEDIUM TREES									
<i>Acacia smalli</i>	✓	Sweet Acacia	●	●		●		●	
<i>Cercidium praecox</i> or <i>Parkinsonia praecox</i>	✓	Palo Brea	●	●	●			●	
<i>Eucalyptus spatulata</i>	✓	Narrow-Leaf Gimlet	●	●	●	●			
<i>Eucalyptus torquata</i>	✓	Coral Gum			●	●	●		
<i>Ficus nitida</i>		Laurel Fig				●	●		
<i>Prosopis alba</i>	✓	Argentine Mesquite	●	●	●			●	
<i>Prosopis chilensis</i>	✓	Chilean Mesquite	●	●	●			●	
<i>Prosopis glandulosa</i>	✓	Honey Mesquite	●	●	●			●	
LARGE TREES									
<i>Eucalyptus microtheca</i>	✓	Coolibah	●	●				●	
<i>Jacaranda mimosifolia</i>		Jacaranda			●	●	●		
<i>Phoenix dactylifera</i>	✓	Date Palm	●						
<i>Washingtonia robusta</i>	✓	Mex. Fan Palm	●						

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Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

SCOTTSDALE ROAD									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
GROUNDCOVERS, VINES, & OTHER									
<i>Dasyllirion longissima</i>	✓	Mexican Grass Tree	●	●					
<i>Hesperaloe parviflora</i>	✓	Red Yucca	●	●	●	●		●	
<i>Lotus berthelotii</i>	✓	Parrot's Beak	●	●	●	●			
<i>Nolina matapensis</i>	✓	Tree Bear Grass	●	●					
<i>Penstemon spp.</i>	✓	Bearded Tongue	●	●	●			●	
<i>Verbena rigida</i>	✓	Sandpaper Rigida	●	●	●				
<i>Yucca rupicola</i>	✓	Twisted Yucca	●	●	●			●	
SHRUBS									
<i>Guaiacum coulteri</i>	✓	Guayacan	●	●	●	●		●	
<i>Leucophyllum candidum</i>	✓	Violet Silverleaf	●	●	●				
SMALL TREES									
<i>Bauhinia lunarioides</i> or <i>Bauhinia congesta</i>	✓	Chihuahuan Orchid Shrub		●	●	●	●		
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		●	●	●	●		
MEDIUM TREES									
<i>Acacia smallii</i>	✓	Sweet Acacia	●	●		●		●	
<i>Cercidium Parkinsonia Hybrid</i>	✓	Desert Museum		●				●	
<i>Cercidium praecox</i> or <i>Parkinsonia praecox</i>	✓	Palo Brea	●	●	●			●	
<i>Ficus nitida</i>		Laurel Fig				●	●		
<i>Prosopis alba</i>	✓	Argentine Mesquite	●	●	●			●	
<i>Prosopis chilensis</i>	✓	Chilean Mesquite	●	●	●			●	
<i>Prosopis glandulosa</i>	✓	Honey Mesquite	●	●	●			●	
LARGE TREES									
<i>Eucalyptus microtheca</i>	✓	Coolibah	●	●				●	
<i>Eucalyptus papuana</i>	✓	Ghost Gum	●	●	●			●	
<i>Washingtonia robusta</i>	✓	Mex. Fan Palm	●						

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Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

INDIAN SCHOOL ROAD									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
GROUNDCOVERS, VINES, & OTHER									
<i>Baileya multiradiata</i>	✓	Desert Marigold	●	●	●			●	
<i>Dalea greggii</i>	✓	Trailing Indigo Bush	●	●	●			●	
<i>Dasyllirion acrotriche</i>	✓	Green Desert Spoon	●	●					
<i>Hesperaloe parviflora</i>	✓	Red Yucca	●	●	●	●		●	
<i>Penstemon spp.</i>	✓	Bearded Tongue	●	●	●			●	
<i>Yucca aloifolia</i>	✓	Spanish Bayonet			●	●	●		
<i>Yucca baccata</i>	✓	Banana Yucca	●	●				●	
SHRUBS									
<i>Cordia parviflora</i>	✓	Little-Leaf Cordia		●	●		●		
<i>Leucophyllum candidum</i>	✓	Violet Silverleaf	●	●	●				
<i>Ruellia peninsularis</i>	✓	Baja Ruellia	●	●	●	●		●	
<i>Salvia leucantha</i>	✓	Purple Mexican Bush Sage			●	●	●		
<i>Tecoma stans</i>	✓	Yellow Bells		●	●	●	●		
<i>Tecoma</i>	✓	Organ Jubilee		●	●	●	●		
SMALL TREES									
<i>Acacia rigidula</i>	✓	Blackbrush Acacia	●	●				●	
<i>Caesalpinia platyloba</i>	✓	Palo Colorado		●	●	●	●		
<i>Lysiloma thornberi</i>	✓	Fern Of The Desert		●	●	●		●	



Landscaped Medians – Appendix 8.1-A

Recommended Plants for Downtown

INDIAN SCHOOL ROAD (continued)									
BOTANICAL NAME	Low Water Use*	COMMON NAME	MAJOR STREET	LOCAL STREET	PEDESTRIAN STREET	PATIO / PLAZA	COURTYARD	PARKING LOT	ENTRYWAY
MEDIUM TREES									
<i>Acacia smalli</i>	✓	Sweet Acacia	●	●		●		●	
<i>Cercidium praecox</i> or <i>Parkinsonia praecox</i>	✓	Palo Brea	●	●	●			●	
<i>Eucalyptus spatulata</i>	✓	Narrow-Leaf Gimlet	●	●	●	●			
<i>Eucalyptus torquata</i>	✓	Coral Gum			●	●	●		
<i>Ficus nitida</i>		Laurel Fig				●	●		
<i>Prosopis alba</i>	✓	Argentine Mesquite	●	●	●			●	
<i>Prosopis chilensis</i>	✓	Chilean Mesquite	●	●	●			●	
<i>Prosopis glandulosa</i>	✓	Honey Mesquite	●	●	●			●	
LARGE TREES									
<i>Dalbergia sissoo</i>	✓	Sissoo Tree	●	●	●			●	
<i>Eucalyptus papuana</i>	✓	Ghost Gum	●	●	●			●	
<i>Washingtonia filifera</i>	✓	Calif. Fan Palm	●						
<i>Washingtonia robusta</i>	✓	Mex. Fan Palm	●						

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